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TRANSACTIONS & STUDIES

of the

College of Physicians of Philadelphia

Volume 32 (Fourth Series)

Number 1 (July 1964)

The Philadelphia Award (1964) Presented to John H. Gibbon, Jr.

DR. JOHN H. GIBBON, JR., President of The College of Physicians of Philadelphia, received The Philadelphia Award for 1964 on April 14. Presentation of the award, a bronze medal and $10,000, was made by Mr. Graeme Lorimer (shown left, along with Dr. Gibbon) at a ceremony attended by more than 300 persons at The Barclay Hotel. Dr. Benjamin Spock, Professor of Child Development, Western Reserve University, made the address of the evening.

Established by the late Edward W. Bok in 1921, The Philadelphia Award is given annually for "a service calculated to advance the best and larger interests of the community of which Philadelphia is the center." The name of the winner is traditionally a closely guarded secret until the presentation. Dr. Gibbon, on receiving the 41st Philadelphia Award, joined a list of six previous winners who were Fellows of The College of Physicians of Philadelphia: Chevalier Jackson (1926), Earl D. Bond (1932), A. N. Richards (1937), Frederick H. Allen (1949), Esmond R. Long (1954), and I. S. Ravdin (1956).

Dr. Gibbon, born in Philadelphia, earned an A.B. degree at Princeton University (1923) and received his M.D. degree from Jefferson Medical College four years later. A fifth-generation physician and third-generation alumnus of Jefferson Medical College, he now heads the Department of Surgery and holds the Samuel D. Gross Chair of Surgery at Jefferson, as did his father before him. His father, Dr. John Heysham Gibbon, President of The College of Physicians of Philadelphia from 1928–31, graduated from Jefferson in 1891, and his grandfather, Dr. Robert Gibbon, in 1847. Great-grandfather John Heysham Gibbon graduated in medicine at the University of Pennsylvania in 1822; he dropped a terminal 's' off the family name. Great-great-grandfather John Hannum Gibbons received his medical doctorate at the University of Edinburgh in Scotland in 1786, came to Philadelphia and became a charter member of The College of Physicians of Philadelphia. Dr. John H. Gibbon and Dr. John H. Gibbon, Jr. are the only father-son combination to hold the presidency of The College of Physicians of Philadelphia since its founding in 1787.

Following graduation from Jefferson Medical College in 1927 and graduate training in surgery, Dr. Gibbon held research fellowships at the Harvard Medical School and at the University of Pennsylvania. Appointed Professor of Surgery at Jefferson in 1946, he was named Head of the Department and Samuel D. Gross Professor in 1956. On receiving The Philadelphia Award he was cited for his

pioneer work in open-heart surgery. For 23 years, including Army service during World War II, Dr. Gibbon worked on an apparatus to make this possible. On May 6, 1953, assisted by a heart-lung machine built from his design, he performed a life-saving repair of a cardiac defect in an 18 year old girl who had been born with "a hole in her heart the size of a half-dollar." It took 27 minutes to repair this defective heart—during which time the machine breathed and pumped blood for the patient. This patient, Miss Cecilia Bavolek, restored to health and now working as a secretary, reigned as "Queen of the 1963 Heart Fund Drive" in Philadelphia.

A Fellow of the American College of Surgeons and of the Royal College of Surgeons of England, Dr. Gibbon has served as President of the American Surgical Association, American Association for Thoracic Surgery, and Society of Clinical Surgery. He is also Past President of the Philadelphia Academy of Surgery and of the Heart Association of Southeastern Pennsylvania.

The University of Buffalo, in 1959, and Princeton University, in 1961, conferred the honorary degree of Doctor of Science on Dr. John H. Gibbon, Jr. The Philadelphia County Medical Society bestowed its coveted Strittmatter Award upon him in 1963, and St. Joseph's College of Philadelphia honored him with its Shaffrey Award in that year. Dr. Gibbon and his wife, the former Mary Hopkinson, also a colleague in physiological research, live in Media, Pa. They have four married children.

Malignant Potential of Polypoid Lesions of the Large Intestine[1]

By LAUREN V. ACKERMAN, M.D.[2]

CARCINOMA of the lung has been the subject of a recent Surgeon General's report. Unfortunately this type of carcinoma, by the time of diagnosis, has a small chance of cure no matter how skilled the surgeon or the radiotherapist. Therefore, it seems logical to try to seek methods of control through prevention. Carcinoma of the stomach used to be a frequent lesion in the United States but, for reasons that are still unexplained, it has shown a prominent fall in frequency (Ferris). Carcinoma of the large intestine is a common cancer in men and women. Unlike carcinoma of the stomach and lung it has a far greater chance of cure through adequate surgery. Radiographic methods of diagnosis of carcinoma of the large intestine have become much more accurate with better techniques (Welin), and repeated proctoscopic examination as part of the yearly physical examination of individuals in the cancer age group has been helpful in finding cancer. Throughout the years there have been numerous articles written concerning the relation of adenomatous polyps to cancer. This paper is devoted to the question of polypoid epithelial tumors of the large bowel and what to do about them after they have been discovered.

For almost ten years we have been concerned with polypoid lesions of the large intestine. We believe that it is important, first, to eliminate the lesions which are not adenomatous polyps and the lesions in which there appears to be incontrovertible evidence that the lesions are not pre-cancerous. In first reviewing a large number of polypoid lesions of the large intestine, it became apparent that a certain percentage were not neoplasms at all. If a strong surgical resident looking through the proctoscope sees a slightly protuberant nodule, he can seize it with the forceps and pull. The harder he pulls, the longer will be the stalk. Such a pseudopolyp may then be sent to a laboratory and described there as an adenomatous polyp. In the past such patients were often sentenced to repeated proctoscopic examinations and barium enemas until either the patient or the surgeon or the radiologist had tired of this endeavor. When looking at out past record of diagnosis, the error of calling such a lesion a true adenomatous polyp has been made in almost 20% of the instances. We concluded that if this error were made in our hospital, it might well have been made in other hospitals (Table 1). Recently in conducting a seminar an artificial polyp was made simply by taking a gross specimen of the large bowel, pulling mucosa out and cutting it off (Fig. 1). This specimen was put in the seminar and a goodly percentage of the pathologists who looked at this bit of mucosa called it an adenomatous

TABLE I

HISTOLOGICAL CLASSIFICATION OF 576 CONSECUTIVE "POLYPS" REMOVED FROM THE LARGE INTESTINE AND THE RECTUM

Well Differentiated Cancer	1
Focal Cancer in an Adenomatous Polyp	1
Villous Adenomas	18
Adenomatous Polyps	322
Mixed Adenomatous and Villous Adenomatous Polyps	18
Retention or Juvenile Polyps	58
Normal Mucosa, Polypoid Shape	93
Lymphoid Polyps	8
Miscellaneous Lesions	57

[1] Thomas Dent Mütter Lecture LXXVI, The College of Physicians of Philadelphia, 4 March 1964.

[2] Professor of Surgical Pathology and Pathology, Washington University School of Medicine, St. Louis 10, Missouri.

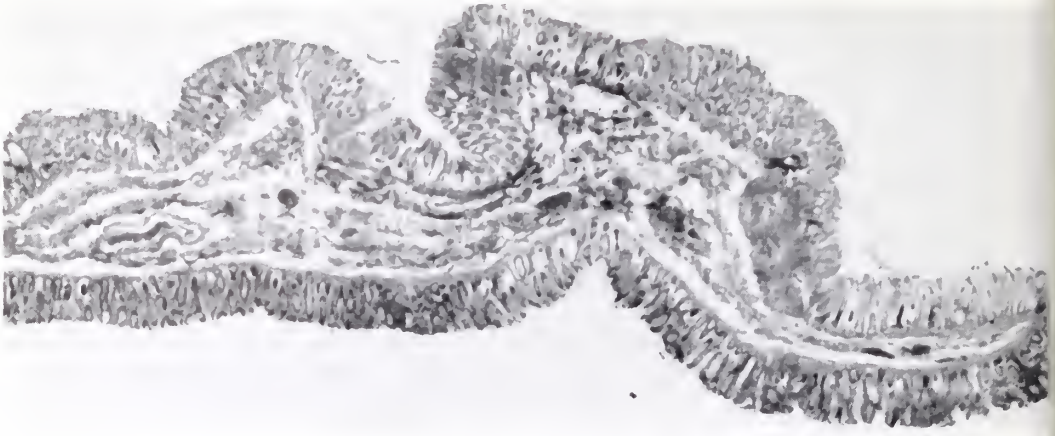


FIG. 1. Pseudopolyp of the large bowel, made by pulling out mucosa and cutting it off (W.U. Neg 64-1724).

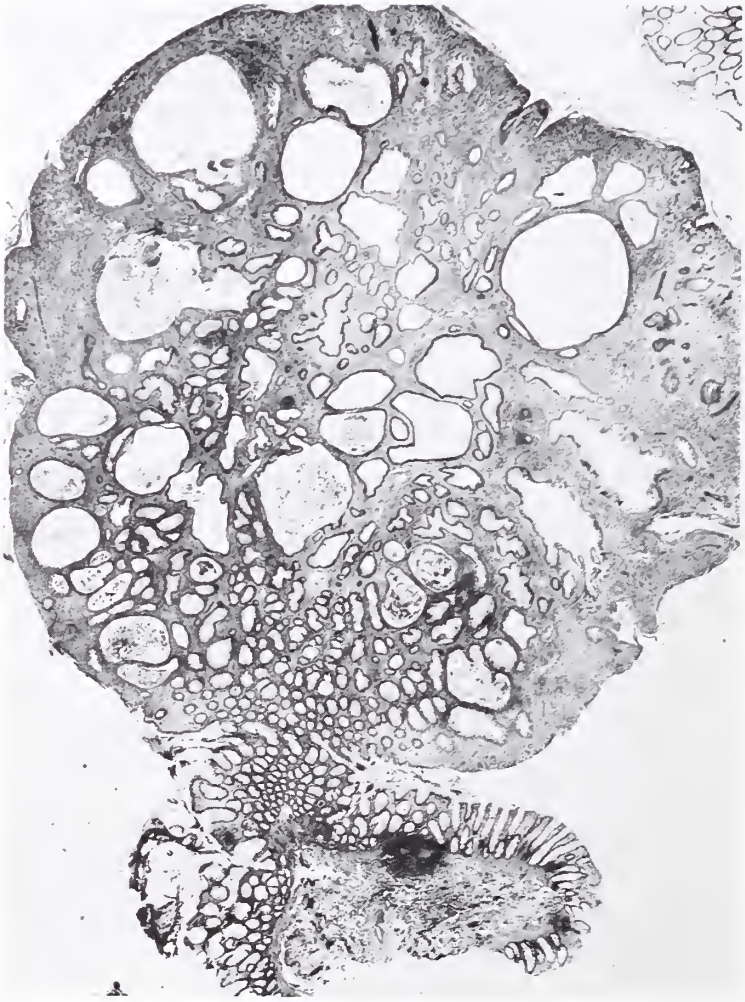


FIG. 2. Photomicrograph of a typical retention polyp in a child. Note the large dilated spaces and the ulcerated surface (W.U. Neg. 56-4348).

TABLE II

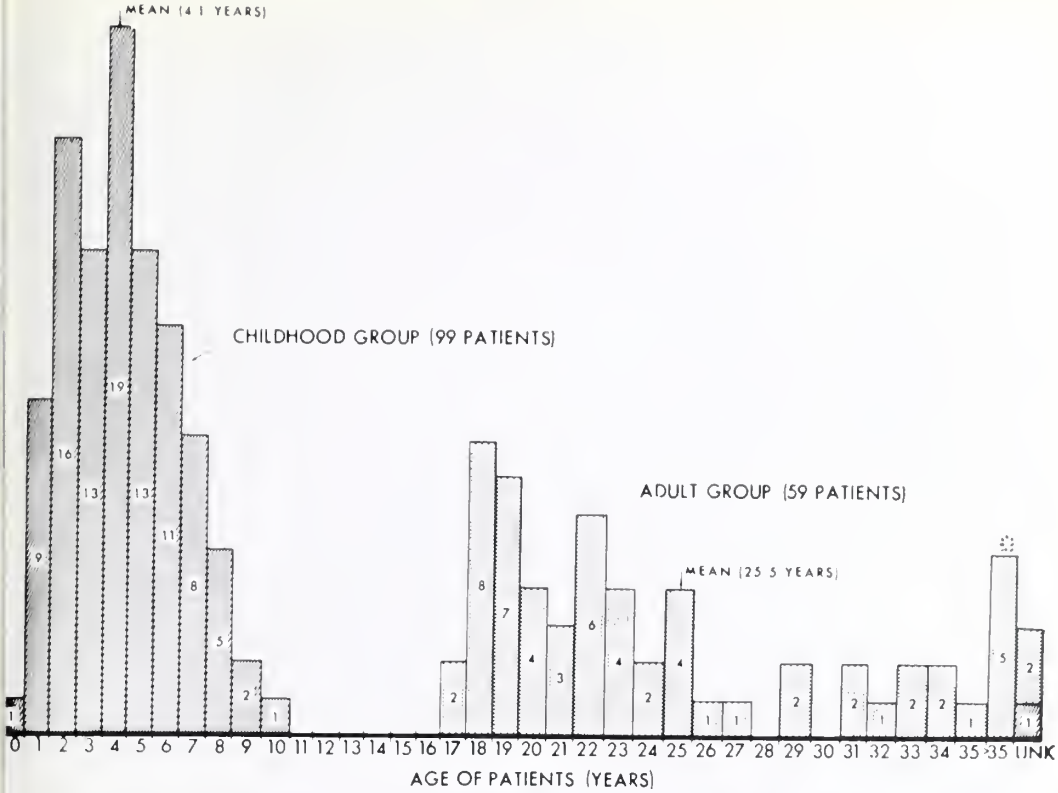


FIG. 3. Villous adenoma involving the appendix with a typical low-power pattern (W.U. Neg. 62-4331).

polyp. Lymphoid tissue is present in the submucosa of the large intestine but is also present in the mucosa. These lymphoid follicles in the mucosa may form small nodules and be mistaken for multiple small polyps. These may occur because of some infection and may disappear when the infection subsides. It is possible that this is the reason for some of the reports that small polyps may spontaneously regress. Localized inflammatory masses may appear clinically as adenomatous polyps.

The retention polyp occurring mainly in children, is not a true neoplasm (Horrilleno) but is only an inflammatory process. We do not agree with Morson that it is a hamartoma. This lesion has no pre-cancerous potentiality but can cause profound hemorrhage or intussusception. It can also be passed spontaneously. Microscopically it has a typical pattern with an ulcerated surface packed with blood vessels and with large cystic spaces filled with mucin. It can be diagnosed almost by its pattern under the low power (Fig.2). The errors that occur with this neoplasm usually appear when there is more than one retention polyp or when this lesion occurs in an adult. Perhaps 20% of them are multiple and we have already seen two examples of colectomies done in small children for this benign lesion. It can occur at any age and we have seen an instance of a retention polyp in an 85 year old woman. Roth pointed out that it is relatively common in the records of the A.F.I.P. in young adults (Table 2).

FIG. 4. Gross photograph of a large villous tumor in the rectal area. Multiple sections at biopsy showed only villous adenoma, but an invasive cancer was present when the lesion was removed at surgery (W.U. Neg. 62-6176).

The Peutz-Jeghers polyp is a rare lesion and has a bewildering microscopic pattern whether it appears in the small or large intestine, or in the stomach. The distortion of the glands in the muscularis mucosae had often caused it to be called an adenocarcinoma occurring in a polyp. The histologic appearance is diagnostic. For all practical purposes this lesion is benign (Burdick) and does not become cancer.

The villous adenoma has a distinctive gross and microscopic pattern. It is relatively rare. It occurs equally in males and females, is usually single and predominantly appears in the rectosigmoid area. However, we have seen it everywhere in the large intestine, with several instances of this lesion in the cecum with involvement of the appendix (Fig. 3). It can also occur in the small intestine (Goldfarb). Such a lesion may cover a large surface area and these patients may develop a syndrome due to potassium loss. Grossly they have a surface made up of soft, mammillated masses. Because of their exuberant growth a small invasive cancer may be hidden by the folds (Fig. 4). If this lesion is spilled into surrounding tissues, it may implant. We have had a recent case in which a large papillary adenoma was removed conservatively and tumor was spilled into the soft tissue near the rectal wall. Seven years later the lesion appeared as a cyst and this cyst was removed intact. It contained mucin and was lined by benign appearing papillary epithelium

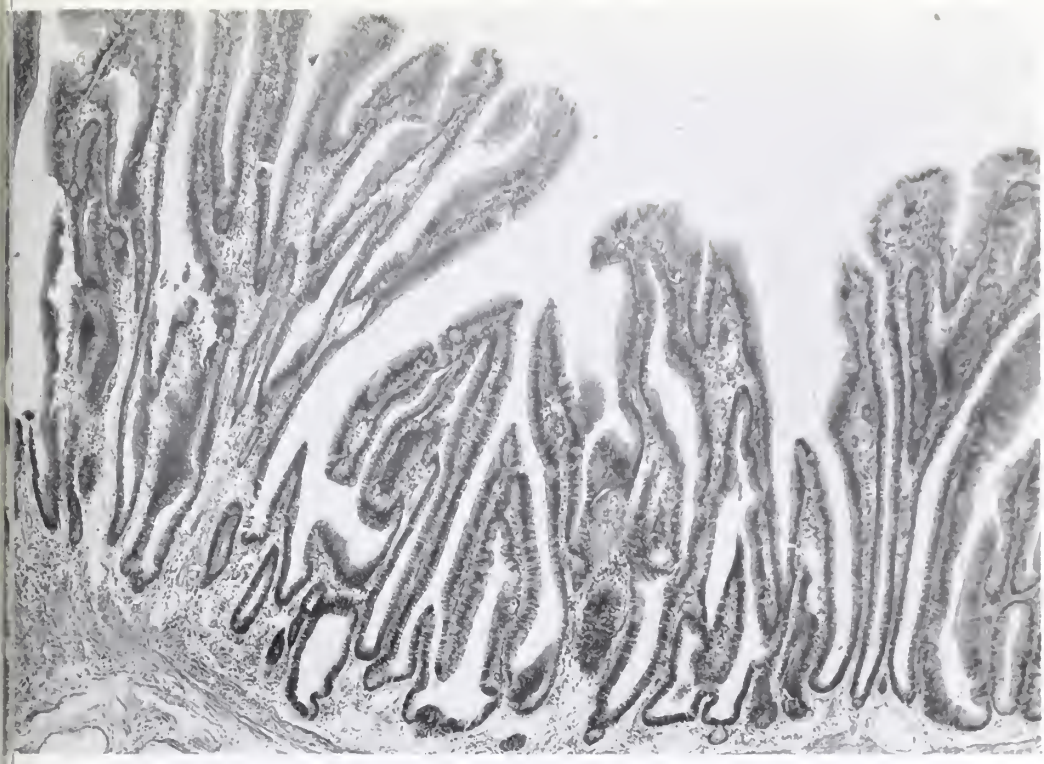
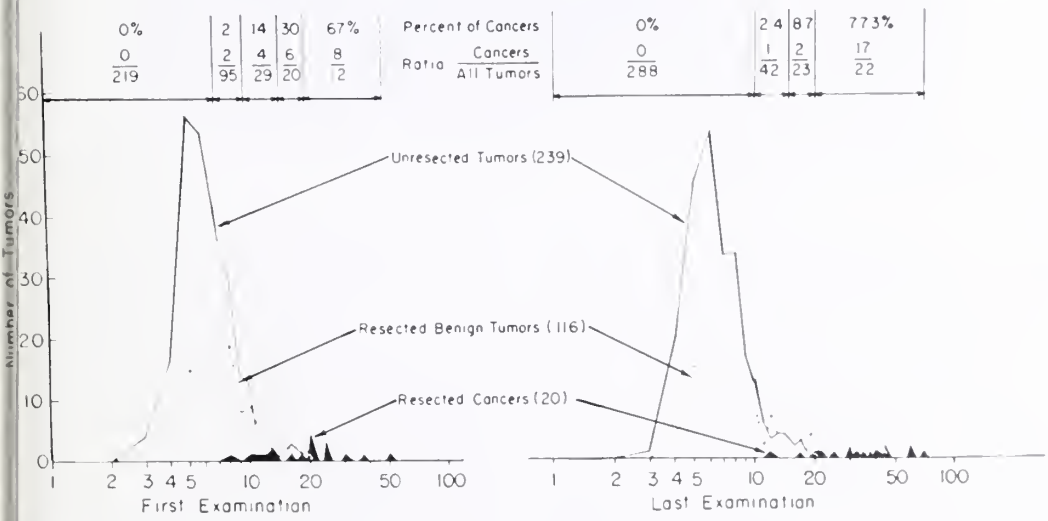


FIG. 5. This is a photomicrograph of the typical growth of the villous adenoma springing directly from the mucosa and showing a frond-like pattern (W.U. 54 2858).

TABLE III

Tumors of the Large Intestine and Rectum



The frequency distribution of the diameters of 375 colonic tumors measured on the first and last of a series of double contrast enema studies. The upper scale gives the frequency of known cancers observed in the bracketed size ranges. Resected benign tumors and cancers were observed for an average of 834 days and the unresected tumors for an average of 939 days.

FIG. 6a. Small polypoid cancer of the large bowel. The stalk was completely free of cancer on subserial sectioning. Two regional lymph nodes were involved (W.U. Neg. 64-335).

(Fig. 5). Infrequently an adenomatous polyp and a villous tumor may combine to form a lesion which we call a villoglandular polyp. Microscopically, a papillary adenoma has a typical pattern.

Now let us review the problem of the adenomatous polyp and consider that we have eliminated the other lesions just described and defined. Adenomatous polyps as well as carcinoma increase in frequency with increasing age. There have been statements in the literature such as "all carcinomas of the large intestine arise from pre-existing polyps". Such statements have led to removal of long segments of large intestine whenever a polypoid lesion was seen. If several polypoid lesions were seen, often total colectomy was done. Such procedures are costly, worrisome to the patient, and not without morbidity and mortality. Many statements made in the past concerning adenomatous polyps of the large intestine do not appear to be true. The statement is made that adenomatous polyps and carcinoma of the large intestine have the same distribution. This is not true, for carcinoma of the large intestine is concentrated in the rectosigmoid area and in the cecal zone, whereas polyps are more evenly distributed throughout the colon (Helwig;

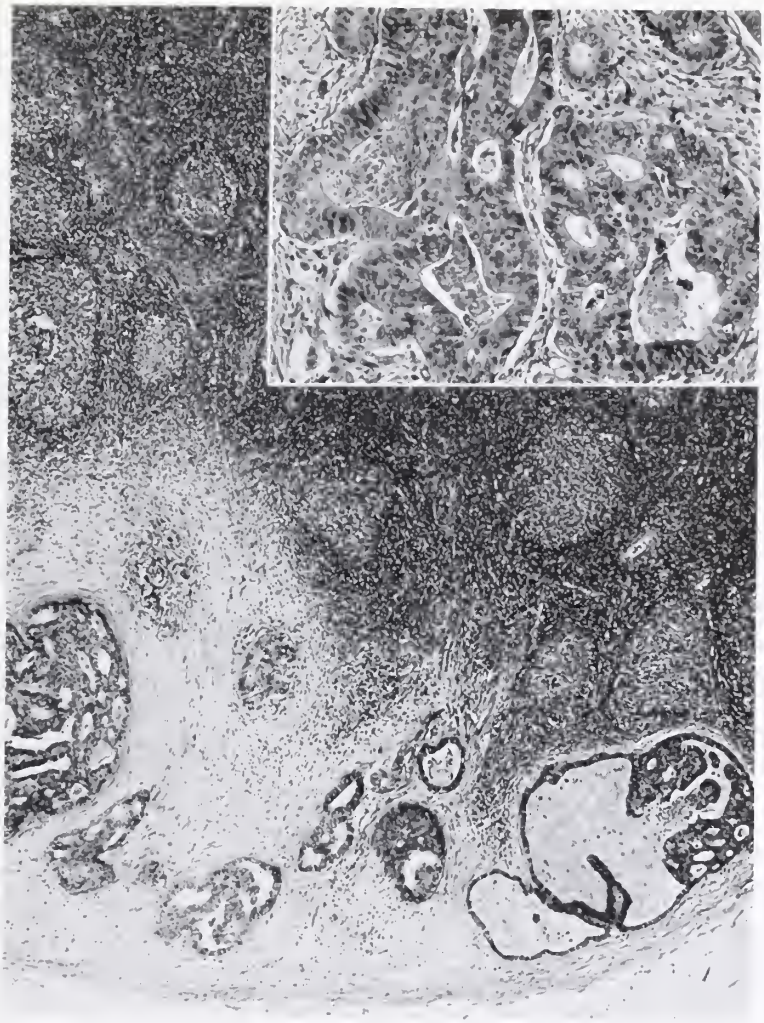


FIG. 6b. Note metastases of this cancer to a regional lymph node. Insert shows detail of this fairly well differentiated adenocarcinoma (W.U. Neg. 64-338).

Feyrter; Hultborn). In a carcinoma of the large intestine you should be able to find evidence of pre-existing adenomatous polyps on sectioning, if polyps are important pre-cancerous lesions. Well developed carcinomas of the large intestine have a sharp line of transition between the normal bowel and the cancer. It could be imagined that if a cancer is large evidence of pre-existing benign polyps could be erased by the growth of the cancer. Therefore we took twenty small cancers two cms. or less, cut them subserially and found no evidence of pre-existing polyps (Spratt, 1962). In the rat, cancers and polyps can be produced by a chemical called 3:2′-dimethyl-4-aminobiphenyl (Spjut, 1964). Adenomatous polyps and cancer produced in the rat were similar to those in man and no morphologic evidence of transition from benign to malignant could be found (Spjut, 1964). If one examines polypoid lesions of the large intestine, these lesions may be all cancer and therefore they are called polypoid cancer. If such a lesion is above the muscularis mucosae the chances of metastasis are probably zero (Kraus). If a polypoid lesion has a focal area that has the microscopic characteristics of cancer, it could be designated as a focal cancer in an adenomatous polyp. If the

FIG. 7. Small lesion picked up by air contrast enema. This pattern is diagnostic of cancer because of the retraction of the surface (W.U. Neg. 60 1110).

stalk is free, the chances of metastasis are practically zero. Personally I have seen only one authenticated case where metastases were present (Fig. 6). We are not surprised at this, for there is at least one exception to everything in pathology and sometimes two. When the pathologist looks at an adenomatous polyp he may be overimpressed with the deep staining nuclei, some atypical glands and will be disposed to call such a lesion cancer. We have continued to be amazed at the liberality with which pathologists diagnose banal adenomatous polyps as cancers. We are not convinced that it is worthwhile to follow a patient who has had one adenomatous polyp removed. Koppel has compared two groups of patients. One group had adenomatous polyps discovered by proctoscopic examination and the other group did not have any polyps on proctoscopic examination. Both groups, on follow-up, developed the same number of cancers. Therefore, there is just as much reason to follow the patient who does not have the polyp as the one who does. Proctoscopic examination is done to find cancer. If a small infiltrating cancer is found appropriate surgery is recommended. If a polypoid lesion is seen by the proctoscope it is usually not a cancer. The entire lesion should

be removed, and then subjected to critical pathologic examination. At times such lesions are springing directly from the mucosa and simply represent a flat, small carcinoma (Fig. 7). Such lesions often infiltrate and metastasize. In most instances, however, there is a stalk. If this stalk shows no evidence of neoplasm, the microscopic pattern of the remaining polypoid mass had no clinical significance. If a polypoid mass is found by roentgenographic examination outside of the range of the proctoscope then the question arises as to what is the risk that this lesion is a cancer. There is a direct correlation between size and the chance that it is a cancer.

The critical size, we believe, is 1 cm. (Welin). Lesions smaller than this can be followed if the lesion is beyond the reach of the proctoscope For larger lesions at the time of exploration, it has been our policy in practically all instances to resect the lesion with a segment of the bowel. Although we recommend resection of the bowel if the lesion is polypoid with a stalk, we have no objection to colotomy and removal of the tumor. Lesions smaller than 1 cm. of course can be cancer, and lesions larger than 3 cms. can be benign. There is certainly some overlapping from the standpoint of size. Generally speaking, lesions 1 cm. or smaller can be followed by appropriately timed roentgen examinations. What is this time? In the colon, the growth rate of polypoid lesions of the large bowel vary. Benign lesions have an extremely slow doubling time, or even may be almost stationary. Inflammatory polypoid masses may grow rapidly, and then their growth is arrested. Villous adenomas and cancer may have similar growth patterns. The growth rate of metastasis of the lung to carcinoma of the large bowel is faster than that of the primary tumor (Collins). We have discussed this growth rate because it has a bearing on how often it is necessary to repeat radiographic studies in a patient who has a polypoid lesion of the large bowel. The fastest growing cancer in our series required 100 days to increase its diameter by only 2.5 mm. There is a margin of error in measurement of plus or minus 2 mm. Therefore, it is not necessary to repeat radiographic studies in any less time than 100 days (Welin).

We have emphasized that many polypoid lesions of the large bowel are not true neoplasms. Others do not become cancer and the risk of an adenomatous polyp becoming cancer must be small indeed. We have found little supportive evidence that adenomatous polyps become cancer. We believe that most cancers are cancer from their inception, and that proctoscopic and radiographic examinations in patients in the cancer age group are done to find cancer, not polyps. We have also indicated a plan of action for the patient who has a polypoid lesion.

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The Basophil Leucocyte as an Index of Immediate Hypersensitivity[1]

By WALTER B. SHELLEY, M.D., PH.D.[2]

IT IS a privilege and a pleasure to give this fifth Hira S. Chouké Lecture. Before proceeding to the scientific portion, may I wing your thoughts back a hundred years, and half way round the world, to a small village in India. Born in this village, bearing his ancestral name of Chouké, Hira was early orphaned. With the determination and energy of an Abraham Lincoln, he educated himself and went on to a successful career in farming and local statesmanship. Ever widening ripples of influence developed as his son, Kehar, became a physician and came to America, where he has distinguished himself teaching anatomy and doing research for forty years. It was in 1955 that Dr. Chouké founded this lectureship in the memory of his father. Inasmuch as his father had suffered a lifetime of migraine, he asked that the lectureship be concerned with allergy, headaches, or closely allied topics. Our presentation, therefore, focusses on a cell which, as I will relate later, may very well be implicated in the pathogenesis of allergic vascular headaches.

Our heroine for today, the basophil leucocyte, has long been a "cinderella cell". Her very existence was denied for years, while her half sisters, the mast cells, were courted and wooed by many. Ignored, misunderstood, and disregarded by generations of physicians, she has only recently "come to the ball".

To go back in history, it was the great Paul Ehrlich who discovered and named the mast cell while he was yet a medical student experimenting on the nature of aniline dyes as stains. Twelve years later, in 1891, he pointed out that another cell with basophilic granules could be shown in the blood stream. With intuitive genius, he recognized that here was a distinctive cell lineage. Nevertheless, not until a generation later were his views to become an indisputable part of our medical thinking. Many well-trained observers viewed this cell as an artefact or degenerating granulocytic form.

All this was swept aside in 1913, when Maximow's elaborate and careful studies gave the blood mast cell a family crest. He proved that here was a cell line morphologically separate from the mast cells. The blood mast cell had its embryonic origins in the bone marrow as a part of the granulocytic leucocyte series. Only after maturation did it enter the blood stream. Furthermore, its distinctive morphology was not lost even after migration into tissue. In contrast, the regular mast cell had a life cycle entirely within the connective tissue.

The inter-twining of the history of these two cell lines continues to this day. Related, yet distinctive, the cells are now given the abbreviated labels of mast cell and basophil. Distributed throughout the entire body as a vast specialized network, they may be viewed as having a common protective mission. They are the components of a binary M. B. system (mastocytebasophil). Regularly, advances in our knowledge of the mast cell have preceded those of the basophil. Just as Ehrlich discovered the mast cell and only later, almost as an afterthought, discerned the basophil, investigators have been spearheading our knowledge with new observations on the mast cell. The reasons for this basophil lag are twofold: one, the basophil is the more shadowy, elusive and fragile of the pair; second, the granular content of the basophil is far less than that of the mast

[1] Hira S. Chouké Lecture V, The College of Physicians of Philadelphia, 8 January 1964.

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cell, so that chemical studies of the basophil invariably require more sensitive and elaborate techniques.

Here, today, we concern ourselves with the basophils. Smallest of the granulocytes in man, they measure 10–15 u, and contain numerous non-refractile spherical (0.3–0.8 u) granules. These granules are acidic in nature and hence appear brick red with the supravital pH stain, neutral red. The nucleus is polymorphous, often appearing bilobed. The basophil is not an active cell, but may show some amoeboid motility. In the fixed preparation, the most distinctive feature is the metachromatic granular structure of the cell. Toluidine blue, for example, stains the granules a purple–red, whereas the nucleus is a light blue. The granules are water soluble and appropriate fixation is always required. Varying in size from 7 to 11 u, the fixed basophil presents a rather prominent large nucleus.

Although basophils may be seen developing in the liver in two month old human embryos, they appear in the blood stream of the embryo at about three months. Shortly thereafter the bone marrow becomes a granulo-poietic organ, and after birth is the exclusive site of basophil formation. The basophils pass through the classic developmental form, promyelocyte, myelocyte, metamyelocyte, and band form to progress to the adult segmented forms. With progressive maturation, the granules become larger and more numerous. The marrow serves in part as a reservoir for basophils, but the precise stimuli for release remain obscure. It is estimated that the life span of the circulating basophil in man is from 8 to 12 days. Interestingly, in rabbits when the basophils have been depressed by cortisone, approximately two weeks is required for the count to return to normal.

Electron microscopy has revealed the basophilic granules to be discrete dense masses and in the case of the guinea pig a specific lamellar structure was apparent. No membrane was seen around the granules.

The very name basophil spells the unifying theme of staining, viz. the granules are metachromatic following exposure to any one of a number of *basic* dyes. These include the classic methylene blue, toluidine blue, and thionin. This stain characteristic is the only reliable method for absolute identification of the cell in man or animals. Without it the basophil is just another colorless white cell. The stain is indicative of the presence of an acid mucopolysaccharide, most likely heparin. Other stains for mucopolysaccharides are positive, supporting this view. Additional histochemical techniques have revealed the presence of histamine and zinc so that the most recent view is that the granule stores a zinc histamine heparin ternary complex, to be released on appropriate stimulation. Arginine, histidine, tyrosine, cysteine, tryptophan and phospholipids are among the less specific compounds to be shown in the basophil granule using histochemical techniques.

Interest in the role of the basophil was quickened in the last decade following the chemical correlation of both heparin and histamine concentrations with the number of basophil leucocytes. The basophil promptly received appellations, such as heparinocyte and histaminocyte, and stood on an equal footing with the mast cell in which these two potent pharmacodynamic agents had already been shown. Every million basophils are estimated to have 3 ug of heparin and 1 ug of histamine, whereas for mast cells these values are 20–60 ug and 7–32 ug respectively. The intravascular circulating store of heparin in an adult man thus can be estimated at about 600 ug and for histamine about 200 ug. More recently the chemists have demonstrated that the basophil is a histamine producing cell since histidine decarboxylase activity can be correlated with the specific presence of basophils only.

The basophil is normally the rarest of the circulating blood cells. Actually there are more red cells in a single drop of blood than there are basophils in your entire body. Only about one in every two or three hundred white cells is a basophil so that the cell seldom presents itself in the "differential". It is below the horizon of standard clinical procedure and hence

for the average clinician out of sight, out of mind. Nevertheless, much information can be secured by absolute basophil counts. With these one finds that normal healthy individuals have between 30 and 40 basophils per cubic mm. of blood.

Many clinical studies have been made on the alterations in the absolute basophil count. Basophilia (basocytosis) has been observed most dramatically in myeloid leukemia. Here enormous counts in the thousands may ensue. Polycythemia vera is another condition with an elevated basophil count. Myxedema regularly is associated with a modestly elevated level, and occasional cases of urticaria pigmentosa have associated basocytosis. Furthermore, we have observed counts of over 200 mm^3 in patients in the recovery phase of marked drug sensitivities. However, turning to animal studies, the basophil count is invariably elevated, often to dramatic heights (40× normal), in the animal experimentally sensitized, but not as yet challenged. Such a basophilia is a temporary reversible process so that weeks later the count has settled to normal.

The reverse side of the coin is basopenia (basocytopenia). Here Rorsman's work in 1957 first pinpointed urticaria as a common clinical cause for basopenia. Others had and have shown that infections, debility, stress, myocardial infarctions, surgery, and peptic ulcers may lead to a considerable drop in the circulating levels. Hyperthyroidism likewise is associated with a low basophil count. Drug-wise, progesterone and steroids, as well as ACTH, have been shown in man to induce distinct drops in the number of circulating basophils.

Although normally not seen in the skin, basophils regularly accumulate at inflammatory sites of allergic origin. Such a dermal migration is entirely characteristic and diagnostic for allergic contact dermatitis, as well as the tuberculin type hypersensitivity response. It does not occur in simple toxic inflammatory responses. Finally, using the Rebuck window technique, a distinctive exudation of basophils has been produced in the skin of patients with ulcerative colitis, Hunner's ulcer (interstitial cystitis) and Hurler's syndrome.

To turn from this background, our own studies on the basophil arose as an effort to develop a laboratory test for the detection of immediate allergic hypersensitivity. The whealing response has been the traditional skin test for such hypersensitivity, but the value of a simple reproducible in vitro test is apparent. We were aware of the fact that the positive skin test involves release of histamine from the cutaneous mast cells as a result of antigen-antibody union. Could not this be done outside the body? Our early efforts with mast cells were unavailing, so we turned to the related basophil. In conjunction with Dr. Juhlin, methods were devised for trapping and concentrating the basophil. We then could observe this blood borne "histaminocyte" in the presence of antigen-antibody reactions. We found that the basophil indeed did degranulate in individuals sensitive to such varied antigens as penicillin, horse serum, bee venom, egg albumin, procaine, aspirin and even "cold". The secret was in the morphologic change rather than in a numerical change. Although it was true that in the severely sensitized patient exposure to the antigen and antibody did cause a drop in the number of basophils, in many instances, the immune response was evident only by close observation of the cytologic change. Such analysis was rendered possible by the typing of each basophil seen and comparison of control with test results. This initial study involved the addition of antigen in varying concentration to fresh heparinized blood. After 15 minutes at room temperature the blood was fixed in a 6–2–2 mix (60% ethyl alcohol, 20% acetic acid, 20% chloroform), lightly centrifuged, supernate removed and cell sediment filtered through a special solvent resistant filter paper. Staining was accomplished in 30 seconds with toluidine blue. Following clearing, this filter paper was mounted on a glass slide and 20–40 consecutive basophils classified.

Using rabbits experimentally sensitized to egg albumin, Dr. Caro and I were able to show that a study of the morphology of the fixed

TABLE I

IN VITRO

BASOPHIL DEGRANULATION TECHNIQUES FOR ANTIBODY DETECTION

	Direct	Indirect
Fixation Filtration	Patient's Blood + Penicillin	Patient's Serum + Penicillin + Rabbit Basophils
Buffy Coat Smear	Patient's Blood + Penicillin	Patient's Serum + Penicillin + Rabbit Basophils
Supravital	Patient's Blood + Penicillin	Patient's Serum + Penicillin + Rabbit Basophils
Chamber	Patient's Blood + Penicillin	

basophil after 15′ exposure to antigen enabled us regularly to detect the sensitized animals.

It was soon possible to extend the techniques of observing the immune basophil response. Using a micro-buffy coat obtained by spinning blood in a plastic tube at high speed for 15 seconds, smears could be made on glass slides and stained, permitting observation of the sensitized basophil response. The smears were made on control and test blood after 15 minutes at room temperature. The artefact of mechanical trauma or disruption of the basophil had to be disregarded, but with experience this proved to be an acceptable simple technique.

As an alternate technique, the cells in the buffy coat could be observed with supravital (neutral red) staining. This permitted observation of a variety of cytologic changes in the living basophil from a sensitized patient when exposed to the specific antigen.

Finally, direct observation of the basophils could be made in the counting chamber employing the standard diluting fluids and saponin to lyse the erythrocytes. Here again the basophil of the sensitive individual showed evidence of characteristic morphologic change when the specific antigen was added to the fresh heparinized blood 15 minutes prior to drawing the blood into the diluent.

In an effort to extend the test to sera, basophils from a variety of animals were exposed to the antigen and serum from sensitized patients. Only the rabbit proved to have a satisfactorily sensitive basophil for this indirect approach. Thus, we found that it was possible to detect immediate type anaphylactic antibody, both by direct testing and by indirect tests employing the rabbit basophil as an index antigen-antibody reaction. With this in vitro miniaturization of anaphylaxis we hope to be able to study further factors which cannot be isolated and studied in vivo.

Technically the tests are more difficult in execution than the simple directions would imply, but a number of observers in various laboratories have confirmed both the direct and indirect basophil degranulation response. The clinical usefulness of such procedures is still under assessment.

The laboratory basophil response is proving to be but an in vitro counterpart of what occurs in the patient. Juhlin has recently studied a patient who regularly developed *headache* and malaise after the ingestion of milk. Blood drawn fifteen minutes after the patient had taken a glass of milk revealed a dramatic drop in the number of circulating basophils. Coincidentally many of the basophils underwent degranulation. This occurred after repeated challenges with milk, but not with food to which he had no sensitivity. Thus, vascular allergic headaches may well result from the histamine released during degranulation of the basophil-mast cell system. Our experience with a similar patient who developed headaches following the ingestion of corn revealed a positive basophil test to corn. Presumably the test may be useful in exploring histamine induced headaches.

Not all of the patients show a dramatic fall in the circulating basophils on in vivo provocation tests. Some we have studied show only a striking degranulation of the circulating basophils. Again, this has been diagnostic. It should be noted, however, that in our studies with sensitized rabbits the induction of anaphylactic shock was almost always associated with com-

plete disappearance of the basophils. Finally it is important to recall that all "immediate" reactions do not take place within minutes. In an adult volunteer subject sensitized to novobiocin, a dramatic drop in the circulating basophils was regularly seen, but not until after several *hours* after the drug was given orally. At the same time as the basophil drop, the patient experienced a sensation of generalized pruritus. Part of the delay may reflect absorption time, but it is likely that in the mildly sensitized person, a critical blood level had to be reached for possible triggering of some antibody release as well as the antibody response itself.

In summary, the basophil is the one cell in the blood responsible for the manufacture and release of histamine when humoral antibodies react with circulating antigens. In the anaphylactic or immediate reaction, the basophil undergoes a decrease in number, as well as a remarkable degranulation. This degranulation response can be reproduced in vitro in a variety of test systems and serves as an in vitro model for the study of anaphylaxis as well as a test for the detection of sensitized individuals.

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Pennsylvania Hospital Admissions, 1751-1850: A Survey*[1]

By ROBERT W. DOWNIE, M.D.[2]

INTRODUCTION

ON 23 January 1751, a group of prominent residents petitioned the Assembly of the Province of Pennsylvania for the founding of a hospital for the lunatics and the sick poor of the Province.[3] The Governor approved the Hospital's charter on 11 May 1751, the beginning of the Pennsylvania Hospital, the first hospital in colonial America.[4]

The charter established a hospital corporation of all who donated ten pounds or more. These Contributors met yearly to elect twelve of their number to serve as Managers for the year. These Managers looked after investments, used interest from the capital stock to pay for the poor patients, appointed physicians and supervised Hospital operation.

The Hospital began in temporary quarters in February, 1752, and moved to its permanent location in January, 1756. The original building, which is still in use, is bordered by Spruce and Pine, and Eighth and Ninth Streets.[5] It has a four-story, square center surmounted by a drum-dome with three story, T-shaped wings extending east and west.[6] The East Wing was completed in 1755, the West Wing in 1796, and the Center section in 1804. The East Wing contained twelve cells for lunatics on the ground story, separate forty bed wards for men and women on the upper two floors, and the rooms for cooking, laundry, etc. When the West Wing was completed, it housed only lunatics. The Center section contained several rooms for the library, apothecary, Managers, and others on the lower stories. A circular operating room occupied almost all the fourth floor and was used until 1868.

Further additions were made to the physical plant. By 1786 the Hospital had added a building to the north of the East Wing which housed "a class of white men and colored people,"[7] and a detached building off the West Wing housed eighteen insane female patients. In 1840 a separate Department for the Insane

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[1] Edward Bell Krumbhaar Prize Essay V, Section on Medical History, College of Physicians of Philadelphia, 1963.

[2] Intern, Gorgas Hospital, Balboa Heights, Canal Zone. Dr. Downie submitted this essay while a student at the University of Pennsylvania School of Medicine, where he received his medical degree in 1964.

[3] The petition was copied into the first minute book of the Board of Managers. It is quoted in full in Morton, *The History of the Pennsylvania Hospital, 1751–1895*.

[4] Medical care was provided at the Philadelphia alms house (later called Blockley) by 1742. Therefore, D. Hayes Agnew asserted that it deserved the distinction of being the nation's first hospital (see Croskey, History of Blockley). There seems to be no question that the Pennsylvania Hospital was the first founded to be a hospital, i.e., a place to treat sick persons.

[5] After rejecting the offer of an unsuitable plot, the Managers purchased the present site of the Hospital from the Penn family.

[6] The center section measured 64 by 61 feet. The East Wing dimensions were 80 by 27 feet for the section extending from the center section crossed at the end by a section measuring 111 by 27 feet. The East Wing measurements were changed slightly to allow for apartments for the lunatics. However, the alteration did not change the symmetrical appearance of the building.

[7] This two-story building was called the Elaboratory. It was built about 1770 for the preparation of medicines for the Hospital. It housed venereal disease patients, sailors, and Negroes. (Managers Minutes, 2 March 1786, and Morton, p. 60–61.) The building is mentioned in the account of 1828 serving the functions cited in the text.

was erected in West Philadelphia about two miles from the Hospital.

The Managers established rules for the admission and discharge of patients.[8] They refused to admit patients with infectious diseases or incurable patients except lunatics. They would admit any Philadelphia resident and others with proper credentials from their place of residence. Before admission, all patients gave the Hospital security for their burial. One bed was provided for accident cases, and other rules governed the proper conduct of patients in the Hospital.

The Managers agreed to accept as many poor patients as the interest from the capital stock could support and used remaining beds for pay patients. Each Wednesday and Saturday (market days) mornings at eleven, two Managers and two Physicians met to admit and discharge patients. A prospective patient was examined by a Physician who certified medical eligibility according to the House rules; the Managers examined his credentials of residence and ability to pay. If accepted, the patient deposited security with the Treasurer and entered the Hospital. At other times prospective patients applied directly to a House Physician who after examining the patient referred him to a Manager who collected his security and ordered admission. The Managers recorded admissions and discharges in the minutes of their monthly meetings and summarized the information about the admissions at the end of each year.

Material for this paper is taken from these records. The author has reviewed admissions to the Hospital during its first hundred years. Pennsylvania Hospital was the first and principal hospital in Philadelphia until 1851, and the Hospital holds a unique place in the history of American medicine.

METHODS AND MATERIALS

At the end of each fiscal year in April, the Managers listed in the Minute Books all patients of that year, in chronological order of admission. Earliest records included the full name, weekly payment for board, diagnosis, dates of admission and discharge, and outcome of hospitalization—"cured", "relieved," "died", "removed by relatives", "eloped", etc. Pregnant women were admitted as new patients with designations of "delivered safe," "died" or "left undelivered". Their babies were recorded as new admissions on the day of their birth with the designations "infant born" or "still born", etc; their dispositions read "left in health" or "died". By 1825, the record included the nation of birth of foreign born patients and by 1830, the patient's age and occupation were noted. A year-end census gave the number of patients and their diagnoses in the House at that time; and this census showed the hospital population at one specific time during each year.

The material for this paper was abstracted as follows: first, the author adopted the designation of the hospital year from April to April. Therefore, 1755 began the latter part of April, 1755 and continued until the same time in 1756. From admission lists, every fifth admission in any given year was recorded for the years 1755, 1760, 1765 . . . through 1850. The sample was one fifth of the admissions, every fifth year during the one hundred year period.

According to their diagnoses, the admissions were grouped in general categories of medical-surgical, psychiatric and obstetric. The obstetric included both pregnant mothers and newborn infants. Psychiatric diagnoses comprised alcoholic and non-alcoholic mental disorders. All others were termed medical-surgical. Information about the most common medical-surgical, psychiatric and obstetric admissions are tabulated and discussed in this paper. The medical-surgical diagnoses were classified according to Eberle's *Practice of Medicine* (1849) which separated acute diseases into fevers and localized inflammatory states and chronic diseases into entities based on the organ system involved.[9]

[8] *ibid* Morton 208–210.

[9] Eberle, John: *The Practice of Medicine*, Philadelphia, 1849. Dr. Eberle was Professor of the Theory and Practice of Medicine at Jefferson Medical College. His descriptions of diseases were essentially the same as

TABLE I

SAMPLE OF NEW ADMISSIONS TO THE HOSPITAL, 1751–1850

	Medical surgical	Psychiatric	Obstetric[1]
1755	17	1	0
60	26	5	0
65	61	6	0
70	68	8	0
75	81	6	0
80	18	6	0
85	14	13	0
90	14	7	0
95	27	16	0
1800	26	9	0
05	63	4	1
10	79	9	0
15	108	21	6
20	103	13	21
25	126	14	7
30	184	18	21
35	171	24	6
40	147	16	16
45	203	6	5
1850	305	12	36
Total in sample	1841	214	119

[1] Includes pregnant women and newborns.

TABLE II

YEAR END CENSUS—TOTAL PATIENT POPULATION

Year	Medical surgical Number	Psychiatric Number	Obstetric Number	Total
1755	15 (82%)	2 (18%)		17
1760	28 (65%)	15 (35%)	—	43
1765	75 (67%)	38 (33%)	—	113
1770	67 (60%)	46 (40.5%)	—	113
1775	39 (64%)	22 (36%)	—	61
1780	17 (50%)	17 (50%)	—	34
1785	12 (28%)	31 (72%)	—	43
1790	20 (40%)	30 (60%)	—	50
1795	21 (33%)	42 (67%)	—	63
1800	26 (32%)	55 (68%)	—	81
1805	61 (52%)	54 (46%)	2 (2%)	117
1810	63 (51%)	61 (49%)	—	124
1815	92 (49.5%)	93 (50%)	1 (.5%)	186
1820	53 (30%)	90 (59%)	10 (11%)	153
1825	69 (40%)	100 (58%)	5 (2%)	174
1830	101 (43%)	126 (54%)	7 (3%)	234
1835	92 (44.5%)	108 (52.5%)	6 (3%)	206
1840	84 (74%)	16 (14%)	14 (12%)	114
1845	103 (91%)	2 (2%)	8 (7%)	113
1850	118 (98%)	2 (2%)	0	120

[1] The official Hospital year was from late April of one year to late April of the next year. Therefore, the year 1755 begins in late April 1755 and ended at the same time in 1756.

In the sampling described above, the author assumed that the relative frequencies of diseases within each year and within five-year periods remained constant. Given this assumption, the sample is representative of total admissions during the one hundred years. To check this assumption, the number of the most common admissions in the sample was multiplied by five, and the estimated total was compared with the actual number of those admissions that year. This was done for the earliest years sampled, and close agreement between estimated and actual totals supported the assumption that the method provides accurate samples of the most common admissions.

RESULTS AND DISCUSSION

The one-fifth sample new admissions each year are shown in Table I.

Medical-Surgical admissions rose rapidly until the Revolution followed by a sharp decline which persisted until after 1800, presumably due to devaluation of capital stock funded in continental currency, the income from which paid for the care of indigent patients.[10] Return to prosperity brought an increase in admissions, especially after the insane patients were transferred to West Philadelphia in 1841 (see below). The table documents slightly more admissions during the last 25 years than the preceding 75 years.

Year-end census figures were recorded at the end of each fiscal year (Table II). The lunatics overpopulated the Hospital; from the Revolution until their transfer to the new department

those of Dr. George B. Wood in his *Treatise on the Practice of Medicine*, Philadelphia, 1847.

[10] The Managers had made loans with pre-Revolution British pounds. Their debtors insisted on repayment with the highly inflationary continental currency. This resulted in a great loss of capital stock.

TABLE III

SEX DISTRIBUTION OF ADMISSIONS IN THE SAMPLE

	1755–1825		1826–1850		Total	Per Cent
	No.	Per cent	No.	Per cent		
Medical-surgical						
Men	707	85	826	82	1533	83
Women	124	15	184	18	308	17
Total	831	100	1010	100	1841	100
Psychiatric						
Men	99	72	58	76	157	73
Women	39	28	18	24	57	27
Total	138	100	76	100	214	100
Obstetric						
Women	20		46		66	—
Infants	15		38		53	—
Total	35		84		119	

TABLE IV

AGE DISTRIBUTION OF ADMISSIONS IN SAMPLE, 1826–1850

	Medical-surgical		Psychiatric		Obstetric		Total	
	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent
0–9	24	2	—	—		—	24	2
10–19	132	13	6	8	5	11	143	13
20–29	434	43	19	25	29	63	482	43
30–39	246	24	19	25	10	22	275	23
40–49	90	9	19	25	2	4	111	10
50–59	51	5	12	16	—	—	63	6
60–69	21	2	1	1	—	—	22	2
70 and older	9	1	—	—	—	—	9	0.75
Not stated	3	1	—	—	—	—	3	0.25
Total	1010	100	76	100	46	100	1132	100

in 1841, they occupied about half the Hospital beds at each census. Overcrowding forced the Managers to limit both the total number of lunatic admissions and the percentage of lunatics that could be poor patients.

Table III shows the constancy of the ratio of men to women patients throughout the period. Men greatly outnumbered women for both medical-surgical and psychiatric admissions. After 1825, admission records include age, occupation, and nation of birth. The age distribution is shown in Table IV. Relatively young patients predominate, and generally, medical-surgical and obstetric admissions were somewhat younger than psychiatric ones.

The occupational status of patients is compared in Table V. Different groups include family members, for example, "a carpenter's wife". Most patients were seamen, unskilled laborers, and craftsmen representing a variety

TABLE V

OCCUPATIONAL STATUS OF MEDICAL-SURGICAL AND PSYCHIATRIC PATIENTS IN SAMPLE, 1826–1850

	Medical surgical		Psychiatric		Total	Per Cent
	No.	Per cent	No.	Per cent		
Seamen	332	33	6	9	338	30
Unskilled laborers and domestics	360	36	8	12	368	34
Skilled laborers and shop clerks	236	23	36	44	272	25
Proprietors and professionals	18	2	26	35	44	4
Other	64	6	0	--	64	7
Total	1010	100	76	100	1086	100

TABLE VI

PLACE OF BIRTH OF ALL ADMISSIONS IN SAMPLE,[1] 1826–1850

	Medical surgical		Psychiatric		Obstetric		Total	
	No	Per cent	No.	Per cent	No.	Per cent	No.	Per cent
America	485	48	46	60	19	41	550	49
Ireland	383	38	18	24	20	44	421	37
England & Wales	60	6	6	8	5	11	71	6
Germany	46	5	3	4	2	4	51	5
Other	36	3	3	4	0	0	39	3
Total	1010	100	76	100	46	100	1132	100

[1] Excluding newborns.

of trades. The smaller number of proprietors and professional individuals included merchants, physicians, ship masters and various "landed gentry". Relatively more psychiatric patients came from the latter classes than from the seamen and unskilled classes, whereas the reverse was true for medical-surgical ones. This is probably due to the limited numbers of indigent patients accepted, and to the wide gap between the quality of psychiatric care available to rich and to poor.

The nation of birth of the patients reflects early nineteenth century immigration to Philadelphia (Table VI). The large number of Irish and other Northern Europeans is striking.

All obstetric patients in the sample were poor patients. The pay-poor status of medical-surgical and psychiatric admissions is compared in Table VII. Over the years, most medical-surgical and obstetric patients, except for seamen, were hospitalized free. The reverse was true for the psychiatric patients.

The outcome of hospitalization for various conditions for medical-surgical and psychiatric patients in the sample is summarized in Table VIII. (Obstetric patients are discussed separately.) Overall percentages of cured, died, etc. compare the outcome of specific conditions presented below. Medical-surgical admissions were in the majority but lunatics dominated the Hospital bed occupancy. Male admissions were more numerous than female. From 1826 to 1850, the patients were chiefly young working class persons, over half foreign born. More detailed information about types of admissions follows.

MEDICAL-SURGICAL

The Managers did not differentiate between medical and surgical admissions in admission

TABLE VII

PAY AND POOR ADMISSIONS IN SAMPLE, 1751–1850

	Pay		Poor		Total	
	No.	Per cent	No.	Per cent	No.	Per cent
Medical-surgical						
Men	690[1]	96	843	74	1533	83
Women	29	4	279	26	308	17
Total	719	100	1122	100	1841	100
Per cent of MS total		39		61		100
Psychiatric						
Men	123	82	34	53	157	73
Women	27	18	30	47	57	27
Total	150	100	64	100	214	100
Per cent of Psy. total		70		30		100
Obstetric						
Women	0	0	66	55	66	55
Infants	0	0	53	45	53	45
Total	0	0	119	100	119	100
Combined total	869	40	1305	60	2174	100

[1] Including 332 seamen whose bills were paid by the United States Marine Hospital Service, 1826–1850. The Hospital signed an agreement with the Service in 1800 to care for sick and disabled seamen, "all infectious cases to be rejected." (Morton, p. 229.)

TABLE VIII

RESULTS OF HOSPITALIZATION OF MEDICAL-SURGICAL AND PSYCHIATRIC ADMISSIONS IN SAMPLE, 1751–1850

	Medical-surgical		Psychiatric		Total	
	No.	Per cent	No.	Per cent	No.	Per cent
Cured or relieved	1513	82	136	64	1649	80
Died	186	10	23	11	209	10
Left before discharged	130	7	46	21	176	9
Unknown	12	1	9	4	21	1
Total	1841	100	214	100	2055	100

diagnoses. The earliest physicians were called "Practitioners of Physick and Surgery" (Morton, P. 440).[11] After 1825 they were appointed as Doctors of Medicine or Surgery, but separation of patients into different services is not apparent from the admission lists. Therefore, a combined classification of admissions, including the traumatic cases with the acute conditions, is presented in Table IX. The most common acute conditions are discussed in some detail.

Contemporary medical authorities agreed that fever was a generalized condition, either primary or secondary to some other disorder. Various fevers were well known to 18th century

[11] Morton, Thomas: *History of the Pennsylvania Hospital, 1751–1895*, Philadelphia, 1897.

TABLE IX

MEDICAL-SURGICAL ADMISSIONS IN SAMPLE, 1751 1850

		Number	Per Cent
Acute			
Fevers		214	12
Localized inflammations			
Venereal	192 (10%)		
Rheumatism	152 (8%)		
Gastrointestinal	94[1]		
Respiratory	86[2]		
Fibro-muscular	32[3]		
Ophthalmologic	23[4]		
Other	32	611	33
Trauma		472	26
Chronic			
Skin ulcers	101 (5%)		
Sore legs	53 (3%)		
Other	390 (21%)	544	29
Total		1841	100

[1] Fever and flux, diarrhea, dysentery, gastritis, hepatitis and others.

[2] Fever and cough, pleurisy, pneumonia, consumption, phthisis, pulmonalis, and others.

[3] Inflammation of arm, wrist, leg, toes and others.

[4] Ophthalmy, inflammation of eyes, and iritis.

authors[12] who discussed the intermittent, remittent and continued fevers as well as the hectic, nervous, and miliary ones.

The first three types of fever were discussed in detail by Eberle and Wood.[13] An intermittent fever waxed and waned at regular intervals as apparent from other names for the condition such as tertian or quotidian agues. Remittent fever was believed to be the same condition in a debilitated person. Therefore, fluctuations in the fever were irregular and the temperature returned to normal only when the fever was cured. Autumnal remittent and bilious fevers were other names for the remittent form. Continuous fever did not fluctuate but remained elevated until the patient died or recovered. Typhus or jail fever and slow nervous fever were examples of the condition.

Eberle separated the causes of fevers into two groups—infections generated from animal or vegetable decomposition, and contagions secreted or generated by actively diseased humans. The first group was further subdivided into the *kiono* or *marshmiasmata* and the *idiomiasmata*. The former were from animal or vegetable waste, and caused intermittent and remittent fevers. The *idiomiasmata* were the exhalations and excreta of humans, causing continued and slow nervous fevers. In the 1830's typhoid fever was separated from the other well known continuous fever, typhus, by W. W. Gerhard at Philadelphia Hospital. Typhus fever was considered contagious but typhoid was not. Five cases of typhus fever appear in the 1850 sample for the first time (Table X). Table X demonstrates the relative frequencies of various fevers, the length of hospitalization of those cured or relieved, and the potentially fatal outcome of the typhus-typhoid continuous fevers.

Rheumatism was differentiated from gout by the authors,[14] as an acute or chronic inflammation of the joints. The acute form was continuous, associated with fever for twelve days or longer and with dolorous, inflammatory tumours on the joints beginning at the third day. Pain and swellings shifted from joint to joint and "metastasized" to internal organs like the stomach, heart or head. The urine was without sediment formation, but later might become red with sediment. Unlike gout, the acute form of rheumatism did not recur. The chronic form sometimes followed the acute form but could arise *de novo*. Characterized by little or no fever, permanent joint swellings and intermittent pains accentuated by changes in weather predominated.

Known predisposing and exciting causes of rheumatism included exposure to cold air when over-heated, venereal disease, biliary disease, struma, and rheumatic matter of the blood or tissues. Exposure to cold air was thought to

[12] Ball, John: *The Modern Practice of Physic*, 2 Vols., London, 1768.

[13] See footnote 9, above. Dr. Wood was Professor of Medicine at the University of Pennsylvania and on the staff of the Pennsylvania Hospital.

[14] *ibid* Ball, p. 313 ff. and *ibid* Eberle, p. 290 ff.

TABLE X

FEVER ADMISSIONS IN SAMPLE, 1826–1850[1]

Outcome	Fever[2]		Intermittent F		Remittent F[4]		Typhoid F[3]		Typhus[5]		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Cured or relieved	28	88	49	91	13	87	7	64	2	40	99	85
Died	2	6	3	5	2	13	3	27	3	60	13	11
Left before discharged[2]	2	6	2	4	0	0	1	9	0	0	5	4
Total number	32	100	54	100	15	100	11	100	5	100	117	100
Per cent of total fever admissions		28		46		13		9		4		100

Hospital days for those cured or relieved

	Fever	Intermittent F	Remittent F	Typhoid F	Typhus F
Median	18	11	16	45	19
Range	6–74	4–132	6–38	19–45	17 and 21

[1] 97 in sample, 1751–1825.

[2] Eloped (i.e., escaped), removed by security or relatives. The security was a person who guaranteed to pay the patient's hospital bill. He had the privilege of removing the patient if he wished.

[3] Types of continuous fever. The number so called declined sharply in 1850 when the typhus-typhoid types were more often used.

[4] Sometimes called autumnal remittent or bilious fever (Currie).

[5] First case in sample 1840.

[6] First case in sample 1850.

TABLE XI

AGE DISTRIBUTION OF RHEUMATIC AND VENEREAL ADMISSIONS IN SAMPLE, 1826–1850

	Rheumatism		Venereal		Total	
	No.	Per cent	No.	Per cent	No.	Per cent
0–9	2	3	—	—	2	1.5
10–19	1	1	6	8	7	5
20–29	28	41	56	73	84	58
30–39	23	34	11	14	34	23
40–49	10	15	4	5	14	10
50–59	3	5	—	—	3	2
60–69	1	1	—	—	1	0.5
Total	68	100	77	100	145	100

TABLE XII

HOSPITALIZATION OF RHEUMATISM[1] ADMISSIONS IN SAMPLE, 1826–1850[2]

Outcome	No.	Per Cent	Median	Range
Cured or relieved	61	90	44	5–203
Died	4	6	—	—
Left before discharged	3	4	—	—
Total	68	100		

[1] Including the more specific meaning of rheumatic fever (1 case), chronic rheumatism (2), rheumatism of head (1), acute rheumatism (2), syphilitic rheumatism (1), scrofulous rheumatism (1).

[2] 84 cases in the sample, 1751–1825.

cause retention of perspiration during a sudden fall in body temperature.

Rheumatism was thought to occur almost always between the ages of 7 and 45, true enough of the Hospital population as shown in the age distribution of rheumatic and venereal patients (Table XI). Certainly the majority were between the ages of 20 and 40, but so were most of the patients in the 1826 to 1850 sample. (See Table IX above). How the rheumatic patients fared once admitted is shown in Table XII. Their hospital stay was lengthy

TABLE XIII

VENEREAL DISEASES ADMISSIONS IN SAMPLE, 1751–1850

Diagnosis	1751–1825		1826–1850		Total	
	No.	Per cent	No.	Per cent	No.	Per cent
Lues venerea[1]	26	23	0	0	26	14
Venereal	70	61	6	8	76	40
Gonorrhea[2]	12	10	8	10	20	10
Syphilis[3]	6	5	58	75	64	33
Buboes[4]	1	1	5	7	6	3
Total	115	100	77	100	192	100

[1] Not used after 1785.

[2] First used 1810.

[3] Syphilis, 1810; chancre, 1830; secondary syphilis, 1840.

[4] First used 1825.

TABLE XIV

SEX DISTRIBUTION OF VENEREAL DISEASE PATIENTS IN SAMPLE, 1751–1850

	1751–1825		1826–1850		Total	
	No.	Per cent	No.	Per cent	No.	Per cent
Men	96	83	76	99	172	90
Women	19	17	1	1	20	10
Total	115	100	77	100	192	100

but the death rate was low by comparison with other patients. The clinical picture of acute rheumatism probably included the mid-20th century diagnoses of rheumatic fever, rheumatoid arthritis, and acute glomerulonephritis.

Diagnoses of venereal diseases changed during the early 19th century. Ball's[15] description of "the veneral disease" was of an acute gonorrhea with other symptoms of chancre, buboes, phymosis, warts and other genital excresences. The disease could progress to urethral stricture, mortification, or abscess formation. A so-called second infection included wide spread ulcers and scaling. By the time of Eberle,[16] syphilis and gonorrhea were distinguished.[17] Syphilis was further separated into the primary or chancre stage and the constitutional stage of fever and patchy skin lesions. The accepted causes of buboes were irritation or absorbed virus. Venereal disease admissions in Table XIII reflect the changing concept of the disease. Until 1825 "lues venerea" and "venereal" were common diagnoses, but after 1825, syphilis became the main venereal diagnosis.

The age distribution of venereal disease patients shows the majority in the 20–29 age group (Table X), and from 1826–1850, patients were almost all men, which was not true of the preceding 75 years (Table XIV). The occupational status of venereal admissions is compared with those admitted for rheumatism or fever (Table XV). Seamen were well represented for all three diseases, but especially for venereal disorders. During the 1826–1850 period, the typical venereal disease patient was a twenty-five year old seaman with syphilis.

During 1826–1850 the results of hospitalization for syphilis and gonorrhea patients differed (Table XVI). In this sample gonorrhea was a self-limited, benign process whereas syphilis showed a more protracted and potentially fatal outcome.

The list of traumatic admissions to the Hospital at any time during the period reads like those to the emergency room of a large general hospital on a Saturday night. Concussions, contusions, lacerations, sprains, and fractures of all kinds were common then as now. In February, 1810, the Managers amended admissions rules to assist the poor patients,[18] and allowed

[15] *ibid* Ball, p. 362 ff.

[16] *ibid* Eberle, p. 780 ff.

[17] Philippe Ricord (1799–1889) is credited with differentiating gonorrhea from syphilis and describing three stages of the latter disease in *Traité Pratique des Maladies Vénériennes*, Paris, 1838.

[18] Managers minutes, 26 February 1810. The Managers formerly established an out-patient emergency service in 1807, although out patient care was given from 1752. The so-called dispensary of the Pennsylvania Hospital divided the city into divisions and had one physician for each district. In 1818 the City of Philadelphia established two dispensaries, after which the Hospital Dispensary was closed. It was reorganized in 1872 (see Morton, 88–107–108).

TABLE XV

OCCUPATIONAL STATUS OF FEVER, RHEUMATISM, AND VENEREAL ADMISSIONS IN SAMPLE, 1826–1850

Occupation	Fever	Rheumatism	Venereal	Total	Per Cent	Total M S Per Cent[1]
Seamen	44 (41%)	36 (53%)	57 (74%)	137	54	33
Unskilled laborers and domestics	40 (38%)	18 (26%)	10 (13%)	68	27	36
Skilled laborers and shop clerks	14 (13%)	12 (18%)	8 (10%)	34	14	23
Proprietors and professionals	6 (6%)	2 (3%)	2 (3%)	10	4	2
Unclassified	3 (2%)	0	0	3	1	6
Total	107 (100%)	68 (100%)	77 (100%)	252	100	100

[1] Percentage of Medical surgical admissions in sample, 1826–1850.

TABLE XVI

HOSPITALIZATION OF PATIENTS IN SAMPLE WITH SYPHILIS AND GONORRHEA, 1826–1850

Outcome	Syphilis		Gonorrhea		Total	
	No.	Per cent	No.	Per cent	No.	Per cent
Cured or relieved	50	86	7	88	57	86
Died	2	4	0	—	2	3
Left before discharge	6	10	1	12	7	11
Total	58	100	8	100	66	100

	Syphilis (50)	Gonorrhea (7)
Hospital days for cured or relieved		
Median	27	10
Range	4–180	5–49

TABLE XVII

TRAUMA ADMISSIONS IN SAMPLE, 1751–1850

	1751–1805		1806–1850		Total Medical-Surgical	
	No.	Per cent	No.	Per cent	No.	Per cent
Trauma	34	8	438	31	472	26
Other	381	92	988	69	1369	74
Total	415	100	1426	100	1841	100

the reception of any accident case in Pennsylvania without security if admitted within 24 hours. This new rule quadrupled the trauma admissions in the succeeding years (Table XVII).

Fractures of various types were a significant portion of the admissions from 1806 to 1850. Table XVIII summarizes the fracture series in the sample. Of sample admissions, fractures of the lower extremity were most common, most lethal, and required the longest hospitalization.

The chronic diseases were too varied and generally of insufficient number to present in tabular form. The two most common ones were skin ulcers (especially of legs) and sore legs (see Table IX). Table XIX lists characteristic examples of the chronic diseases.

In summary, of the medical-surgical admissions, fevers, rheumatism, venereal diseases, and trauma were most frequent. Young adult, working class men were most often the patients, and seamen were well represented, especially for venereal diseases.

The Hospital admitted about 46,000 medical-surgical patients in the first hundred years. From 1826–1850 the patients were mostly adult males under forty suffering from infectious diseases or various injuries. The types of medical problems represented by admissions was influenced by the patient population and the Hospital admission policy. First, some factors shaping the patient population include the large number under forty, the predominance of men, the low socio-economic status of many, the large number of seamen, and the large number of immigrants. Second, the Hos-

TABLE XVIII

FRACTURE ADMISSIONS IN SAMPLE, 1806–1850

Outcome	Clavicle		Upper Arm		Forearm		Thigh[1]		Lower Leg[1]		Other		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Cured or relieved	9	90	19	86	11	100	21	81	30	83	21	75	111	84
Died	0	0	2	9	0	0	2	8	6	17	4	14	14	10
Left before discharged	1	10	1	5	0	0	3	11	0	0	3	11	8	6
Number	10	100	22	100	11	100	26	100	36	100	28	100	133	100
Per cent of total	0	7	—	17	—	8	—	20	—	27	—	21	—	100

	Clavicle	Upper Arm	Forearm	Thigh	Lower Leg	Other
Hospital days for those cured						
Median	30	33	34	68	65	
Range	8–67	8–155	18–46	16–168	5–160	

[1] Both simple and compound. In 1850 the treatment for the latter is amputation.

pital refused the admission of diseases considered "infectious" and incurable cases except for lunatics. The Hospital's experience stands as its own based on its purposes and particular circumstances.

PSYCHIATRY

The social problem posed by the lunatics is reflected in the opening two paragraphs of the original petition to the Assembly.[19]

> "That with the Numbers of People, the Number of Lunaticks or Persons distempered in Mind or deprived of their natural Facilities, hath greatly increased in this Province.
>
> "That some of them going at large are a Terror to their Neighbors, who are daily apprehensive of the Violences they may commit; and others are continually wasteing their Substance, to the great injuries of themselves and Families; ill disposed Persons wickedly taking advantage of their unhappy condition, and drawing them into unreasonable Bargains."

Lunatics were the second major group for which the Hospital was founded, and were among the earliest admissions.[20] Total admissions were moderate in number but their length of stay meant that they occupied about half the beds from 1780 to 1840 (see Table II). This and other considerations influenced the Managers to establish a separate Department for the Insane. Transferring patients occurred early in 1841, and thereafter, acute alcoholism in various forms provided almost all the psychiatric admissions to the Department for the Sick and Injured at Eighth and Spruce.

Until construction of the separate Department for the Insane, all psychiatric problems were admitted to the Hospital. The ratio of men to women is shown in Table XX. Men are the majority of admissions throughout the period. Until 1805, "lunacy" was the major psychiatric diagnosis (Table XXI). After 1805, this word was dropped and "insanity" was the predominant category (Table XXII).

Table XXII shows the use of "mania", an acute, non-alcoholic mental disorder. Acute admissions for alcoholism were infrequent before 1805 but increased thereafter, especially after transfer of insane patients in 1841. Almost all

[19] Recorded in volume one of Managers' Minutes.

[20] In the early days of the Hospital the lunatics were housed in cells in the ground story of the East Wing. On Sunday afternoons Philadelphians could pay a fee to observe them. Conditions in the West Wing were somewhat better. A letter from Benjamin Rush to the Managers (recorded in 24 September 1810 Minutes) gave evidence of the poor conditions for the lunatics and suggestions for improving their care.

TABLE XIX

EXAMPLES OF CHRONIC DISEASE ADMISSIONS IN SAMPLE

Orthopedic
carious bones
stiff limbs
painful limbs
swelled knees
sore heel or neck
diseased wrist
diseased thigh
tumor of leg
cartilage in knee
sciatica
ulcers
ulcer in leg
sore leg

Genito-urinary
stone or gravel
scirrhous testicle
female disorder
suppression of urine
mortified penis
urethral structure
scrotal hernia
paraphimosis
menorrhagia
hydrocele
hematuria
uterine disease
amenorrhea
incontinentia
uterine hemorrhage
disease of bladder
disease of kidney

Edematous
dropsy
asthma dropsy
swelled legs
anasarca
ascites
swelling

Ophthalmologic
eyes disorder
gutta serena
cataract
tumors of eye
amaurosis
strumous ophthalmia

Nervous
paralysis
St. Vitus dance
nervous affection
palsy
vertigo
apoplexy
epilepsy
neurosis
paraplegia
cephalgia
neuralgia
cerebral disease
hemiplegia
nervous tremors
cholera

Respiratory
asthma
hemoptysis
hydrothorax

Gastro-intestinal
obstruction of liver
spleen
visceral obstruction
constipation
hematemesis
disease of stomach
disease of liver
fistula in ano
disease of rectum
piles
hemorrhoids
worms

Miscellaneous
weakened by blood loss
a rupture
bad habit of body
cancer
frost bite
debility
pain in breast
asphyxia from cold
spasms
hydrophobia
aneurism
whitlow
varicose veins
hare lip
drinking cold water
palpitation of heart
necrosis
salivation
anemia
poisoned laudanum
epistaxis

Dermatologic
scorbutic ulcers
itch
scurvey
yaws
scrofula
leprosy
ecthyma
tetter
herpes zoster
psoriasis
prurigo
eczema
tinea capitus
porrigo

alcoholic and all acute non-alcoholic admissions in the 1806–1850 sample were men. Table XXIII compares the age distribution of the alcoholic and non-alcoholic admissions. The alcoholic patients were a distinctly older group than the non-alcoholic admissions.

Persons from different occupational strata tended to have different types of psychiatric

TABLE XX

PSYCHIATRIC ADMISSIONS IN SAMPLE, 1751–1850

	1751–1825		1826–1850		Total	
	No.	Per cent	No.	Per cent	No.	Per cent
Men	99	72	58	76	157	73
Women	39	28	18	24	57	27
Total	138	100	76	100	214	100

TABLE XXI

PSYCHIATRIC ADMISSIONS IN SAMPLE, 1751–1805

	Men		Women		Total	
	No.	Per cent	No.	Per cent	No.	Per cent
Lunacy	50	93	27	100	77	95
Drunken madness	2	3.5	0		2	2.5
Deranged or insane	2	3.5	0		2	2.5
Total	54	100	27	100	81	100

TABLE XXII

PSYCHIATRIC ADMISSIONS IN SAMPLE, 1806–1850

	Men		Women		Total	
	No.	Per cent	No.	Per cent	No.	Per cent
Insanity	62	60	23	77	85	65
Mania	6	6	0		6	4.5
Alcoholism[1]	28	27	3	6	31	23
Other[2]	7	7	4	7	11	7.5
Total	103	100	30	100	133	100

[1] Delerium tremens, mania a potu, and insanity from intemperance.

[2] Derangement, lunacy, madness, hysteria, dementia, and suicide.

problems necessitating admission (Table XXIV). Proprietors and professionals were more likely to be psychiatric than medical-surgical patients (see Table V); of psychiatric patients, the proprietors were likely to have a non-alcoholic disorder. The skilled laborers dominated both conditions, especially the alcoholic disorders. Non-alcoholic psychiatric patients were more likely to be American than foreign-born during the period for which information is available (Table XXV), but alcoholic patients had approximately the same percentages of American and foreign-born as did medical-surgical admissions (see Table VI). To summarize, the typical non-alcoholic, psychiatric patient during 1826–1850 was a twenty-five year old American-born skilled laborer or proprietor. His alcoholic counter part was a forty-five year old, Irish or American born skilled laborer.

The outcome of hospitalization for both diagnoses of "lunacy" and "insanity" are presented. Lunatics behaved in accord with the

TABLE XXIII

AGE AND SEX OF PSYCHIATRIC ADMISSIONS IN SAMPLE, 1826–1850

	Non-Alcoholic				Alcoholic				Total	
	Men		Women		Men		Women			
	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent
10–19	3	9	3	18	0	0	0	0	6	8
20–29	13	11	2	12	3	12	1	100	19	25
30–39	5	16	7	40	7	27	0	0	19	25
40–49	6	18	3	18	10	38	0	0	19	25
50–59	1	13	2	12	6	23	0	0	12	16
60–69	1	3	0	0	0	0	0	0	1	1
Total	32	100	17	100	26	100	1	100	76	100

TABLE XXIV

OCCUPATION OF PSYCHIATRIC ADMISSIONS IN SAMPLE, 1826–1850

	Non-Alcoholic		Alcoholic		Total	
	No.	Per cent	No.	Per cent	No.	Per cent
Seamen and unskilled laborers	9	18	5	18	14	18
Skilled laborers and shop clerks	19	39	17	64	36	48
Proprietors and professionals	21	43	5	18	26	34
Total	49	100	27	100	76	100

TABLE XXV

NATION OF BIRTH OF PSYCHIATRIC ADMISSIONS IN SAMPLE, 1826–1850

Nation	Non Alcoholic		Alcoholic		Total	
	No.	Per cent	No.	Per cent	No.	Per cent
America	34	70	12	44	46	60
Ireland	8	16	11	41	19	25
England and Wales	4	8	2	7	6	8
Germany	1	2	1	4	2	3
Other	2	4	1	4	3	4
Total	49	100	27	100	76	100

TABLE XXVI

HOSPITALIZATION OF LUNACY ADMISSIONS IN SAMPLE, 1751–1805

Outcome	No.	Per Cent	Median	Range
Cured or relieved	46	60	31	3–2555 plus
Died	9	11	655	61–1313
Left before discharged[1]	19	25	68	5–1664
Unknown	3	4	—	—
Total	77	100		

[1] Eloped, removed by security, or removed by family or relatives.

TABLE XXVII

HOSPITALIZATION OF INSANITY ADMISSIONS IN SAMPLE, 1806–1835

Outcome	No.	Per Cent	Median	Range
Cured or relieved	34	47	65	4–356
Died	8	11	400	6–9863
Left before discharged[1]	27	38	97	14–3305
Unknown	3	4		
Total	72	100		

[1] Eloped, by security, by friends or relatives.

TABLE XXVIII

HOSPITALIZATION OF ALCOHOLIC ADMISSIONS IN SAMPLE, 1826–1850

Outcome	No.	Per Cent	Hospital Days of Cured	
			Median	Range
Cured or relieved	23	85	6	3–34
Died	4	15	—	—
Total	27	100		

expected two-thirds recovery rate in the Manager's original petition to the Assembly (Table XXVI). However, the record for those diagnosed "insane" is much poorer. (Table XXVII). The number of "insane" patients helped was smaller and the length of their hospitalization was twice that of the "lunatics". The percentage of "insane" who left undischarged was greater and their hospitalization was longer for the insane than for the lunatic patients, and it is unwarranted to assume that an increased number of those who left undischarged meant that those who did stay had to remain longer for cure or relief. The most obvious explanation for the difference in hospitalization of those cured or relieved would be the removal of more acute alcoholic and non-alcoholic problems from the undifferentiated diagnosis of "lunacy", to make "insanity" include only more chronic cases. The hospitalization for acute alcoholic disorders is shown in Table XXVIII. These figures suggest that removal of acute non-alcoholic and alcoholic disturbances from the category of "lunacy" help to explain the differences between the hospitalization of "lunatic" and "insane" patients.

The main differences between medical-surgical and psychiatric patients were that the latter were somewhat older, included relatively more women, tended to be American- rather than foreign-born, were of a higher occupational status, and paid for their hospitalization. They were not treated as diseased but rather as potentially dangerous social misfits, and their prognosis was relatively poor both in length of hospitalization and in potential for cure. They presented special problems of housing, nursing, medical care and disposition. A separate department for the insane con-

TABLE XXIX

OBSTETRIC ADMISSIONS IN SAMPLE, 1801–1850

	1801–1825	1826–1840	1841–1850	Total
Women				
Admitted	20	21	25	66
Delivered safe	18	17	24	59
Died	1 (5%)	2 (10%)	0	3 (5%)
Left undelivered	1	2	1	4
Hospital days[1]				
Median	49	42	28	—
Range	24–122	0–109	10–108	—
Infants				
Born	15	22	16	53
Left in health	13	16	16	45
Died	2 (13%)	6 (30%)	0	8 (15%)
Hospital days[1]				
Median	21	15	14	—
Range	0–150	0–34	9–32	—

[1] All patients.

tinued the same medical philosophy regarding the nature of the disorders but permitted greater flexibility in the treatment of psychiatric and medical-surgical patients.

OBSTETRICS

The age distribution of pregnant women is presented in Table IV (see above). Table XXIX summarizes obstetric admissions in the sample. Maternal mortality and infant mortality were eliminated in the last ten years. The overall maternal mortality rate of five per cent agrees with Morton's figure of 4.72 per cent for the Lying-In Department.[21] He does not cite figures for infant mortality.

The first birth in the Hospital was recorded in 1765.[22] Obstetrics received no special consideration until a Lying-In Department was announced in 1803. A special fund for the care of indigent pregnant women was given by the First Troop of Philadelphia Cavalry from the Revolution. The Department operated continuously except for brief closures during parts of 1830 and 1835 because of outbreaks of puerperal fever. For the same reason the department was again closed in 1851 and was discontinued in 1854.

[21] *ibid* Morton, p. 239.

[22] *ibid* Morton, p. 234 ff.

SUMMARY

Admissions to the Pennsylvania Hospital, 1751–1850, are reviewed and a 20 per cent sample of the Hospital admissions every fifth year from 1755 to 1850, are classified according to criteria accepted at the time. The most common medical-surgical and psychiatric disorders are compared as to length of hospitalization and outcome, and information concerning obstetric admissions and newborns is presented. After 1825, more information is available concerning the age and social background of the patients, and this material is tabulated for the more common conditions.

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The Development of the National Library of Medicine[1]

By GERARD P. SMITH, CAPTAIN MC, U. S. ARMY[2]

THE National Library of Medicine usually dates its beginning from the year 1836. A review of the records of the time does not reveal the reason for this choice. Certainly this birth date omits the contribution of the Army's first Surgeon General, Dr. Joseph Lovell. He was appointed to the newly created post in 1818 and served until his death in 1836. The first evidence that books and periodicals had a place in his office was the record that the *Medical Recorder* and the *Medical Repository* for 1821 had been purchased. In 1822, a subscription to the *Western Quarterly Reporter of Medical, Surgical and Natural Science* began. Perhaps, of more importance, were the continuing requests from scattered post surgeons for medical books of all types, e.g., *U. S. Pharmacopoeia*, *Thomas's Practice*, *Cooper's Surgical Dictionary*, etc. This was a modest trade at best, as the archives show yearly expenditures of $400 and $500 for "Medical books and vaccine matter;" but it quickly became an established custom. Certainly William Beaumont made frequent use of Dr. Lovell during the eight years of his classic study on the digestive physiology of Alexis St. Martin. Dr. Beaumont showed his appreciation when his book was published in 1833 by dedicating it with affection to Dr. Lovell in these words:

"To Joseph Lovell, M.D.
Surgeon General of the United States Army
Whose merit justly entitles him to the rank which he holds,
And whose zeal in the cause of Medical Science is equalled only by his ability to promote it.
As a tribute of respect for his public and private virtues,
And as a feeble acknowledgement for a long, tried and unvarying friendship,
This work is respectfully dedicated, by
The Author."(1)

Doctor Lovell died quite suddenly in 1836, and his successor was one Thomas Lawson. He was to watch and develop the "Library of the Surgeon General's Office" for the next 25 years. He had the dubious distinction of seeing his Library for the first time two years after his appointment because a Seminole Indian uprising in the South detained him in the field. Upon his return to Washington, he promptly became the villain in an argument with Beaumont which began with a refusal of Beaumont's request for leave and ended with a bitter acceptance of Beaumont's resignation in 1839. He demonstrated a similar lack of "largeness" almost ten years later when he flatly rejected the idea of using ether in Army surgery. However, Dr. Lawson had a sense of duty and a firmness which included the Library. The first catalogue of its contents appeared in 1840 under his direction. There were 130 titles listed alphabetically, and this accounted for the 200 volumes which were the Library. In paging through a copy of this first catalogue, one can exhaust the Surgeon General's Library's listing for "L" by going through Lund on Hot Climate, Laennec on the Chest, and Lawrence on the Eye. The Library was born, but just barely.

One month after the Civil War began, Lawson died of a stroke. Clement Finley succeeded for one year, but was then removed in

[1] Read before the Section on Medical History, The College of Physicians of Philadelphia, 8 January 1963.

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favor of William A. Hammond who then served for two years. During the war period, the Library grew slowly. The catalogue of 1865 listed 2253 volumes and 44 journals and reviews, most of them American; but the life of the Library was about to change for two reasons. The first reason was in the form of a windfall amounting to $85,000 which came to the Surgeon General at the close of the Civil War. It was the fund accumulated at the various general hospitals from the sale of soaps, fat and liquor. The second reason was in the form of a hurricane by the name of John Shaw Billings who became the Librarian in the autumn of 1865. The risk in speaking of the development of the National Library is to devote the entire talk to Billings. And understandably so, for Billings was an attractive man, one of the heroes of America's Heroic Age in Medicine, and he was by common consent the force which made the Library live.

The number of surgeons who become librarians is not large. Billings's interest seems to have begun with frustration with the *status quo*. As a medical student he was required to submit a thesis as a prerequisite to graduation and, as he told the members of the graduating class of his alma mater in 1888, "In the thesis just referred to, it was desirable to give the statistics of the results obtained from certain surgical operations as applied to the treatment of epilepsy. To find these data in their original and authentic form required the consulting of many books, and to get at these books I not only ransacked all the libraries, public and private, to which I could get access in Cincinnati, but for those volumes not found here (and these were the greater portion), search was made in Philadelphia, New York, and elsewhere, to ascertain if they were in an accessible library in this country.

"After about six months of this sort of work and correspondence, I became convinced of three things. The first was, that it involves a vast amount of time and labor to search through a thousand volumes of medical books and journals for items on a particular subject, and that the indexes of such books and journals cannot always be relied on as a guide to their contents. The second was, that there are in existence somewhere over 100,000 volumes of such medical books and journals, not counting pamphlets and reprints. And the third was, that while there was nowhere, in the world, a library which contained all medical literature, there was not in the United States any fairly good library, one in which a student might hope to find a large part of the literature relating to any medical subject, and that if one wished to do good bibliographical work to verify the references given by European medical writers, or to make reasonably sure that one had before him all that had been seen or done by previous observers or experimenters on a given subject, he must go to Europe and visit, not merely one, but several of the great capital cities to accomplish this desire.

"It was this experience which led me when a favorable opportunity offered at the close of the war, to try to establish, for the use of American physicians, a fairly complete medical library, and in connection with this to prepare a comprehensive catalogue and index which would spare medical teachers and writers the drudgery of consulting ten thousand or more different indexes, or of turning over the leaves of as many volumes to find the dozen or so references of which they might be in search" (2).

As he said, he wanted to establish "a fairly complete library and in connection with this to prepare a comprehensive catalogue and index. . . ." Billings had vision, but he also had the good sense to begin. In fact, he prized that particular faculty. When praised in later years for his success in getting work done, he replied: "I'll let you into the secret—there's nothing really difficult if you only begin—some people contemplate a task until it looms so big, it seems impossible, but I just begin and it gets done somehow. There would be no coral islands if the first bug sat down and began to wonder how the job was to be done" (3).

By 1872 Billings's beginning had borne fruit. The catalogue now contained 13,000 titles and the necessity of the Library was plainly stated for the first time by Surgeon General Barnes

in the following request for a larger appropriation to the Chairman of the House Appropriations Committee, the Hon. James A. Garfield: "The Library of the Office is now in a fireproof building and is in effect a necessary supplement to the Congressional Library. It should contain every medical work published in this country and every work relating to state medicine; for when legislation becomes necessary on these subjects, as it surely will, such a library will be indispensable and it cannot be formed on short notice" (4).

The appropriation increase was granted and the Library continued to grow. And it was Billings, with approximately a dozen untrained clerks, who tended and tilled the continuously increasing stacks. It was quite a load for Billings, which may have prompted his remark in later years that the librarian is in one respect only a sort of hod-carrier who brings together the bricks made by one set of men in order that another set of men may build therewith (5).

In 1876, Billings looked up from his desk into the face of his new assistant, Dr. Robert Fletcher. Unknown to both of them, they had been in Cincinnati together in 1858 and 1859. Billings was in medical school and Fletcher advertised himself in the City Directory as a "Commission Merchant and Agent for Landreth's Garden Seeds" (6) which is not exactly the employment you would expect from a man who finished with the highest grades in two tests he took to secure his Army position of Contract Surgeon and whose medical education was obtained in Bristol, England. His failure as a practitioner might be explained by his favorite prescription for any ailment: "Treat it with contempt" (7). He was a remarkable man in many ways; very able, accurate in the extreme, scholarly with a deep knowledge of English literature and given to quiet, careful work. Dr. Fielding H. Garrison, who was both his friend and assistant, was moved by his death in 1912 to write to Harvey Cushing that Fletcher was everything we expect the English gentleman of the highest type to be (8). His arrival was propitious and the fact that the older Fletcher was to assist the younger Billings never seemed to matter. Almost from the first, they were productive and it was often said that Billings proposed and Fletcher disposed. As a generalization, it was better than most and it was to Billings's credit that he always made it quite clear in a public manner his affectionate gratitude for Fletcher's efforts.

Just before Fletcher arrived, Billings had published the *Specimen Fasciculus of a Catalogue of the National Medical Library*. The *Fasciculus* was the forerunner of the *Index Catalogue* and its enthusiastic reception made the *Index Catalogue* possible, although a reluctant Congress withheld approval until 1879 when $20,000 was authorized. In the usual pattern of these matters, more money was required before publication could be completed, but the money was obtained and, in 1880, Volume 1 of the *Index Catalogue* appeared with authors and subects arranged in dictionary order in a single alphabet. The Library's collection now numbered about 70,000 volumes. Billings's initial vision to establish "a fairly complete library and in connection with this to prepare a comprehensive catalogue and index" had become a fact. However, the success of the initial volume of the *Index Catalogue* immediately posed a problem. After all, it would take at least 15 to 20 years to publish the entire *Catalogue*; in fact, it took 16. What was to be the bibliographical tool for the medical literature which came out during that time? The answer that Billings proposed and Fletcher disposed was the *Index Medicus*. This item was published monthly, covered the entire alphabet and listed only new literature. Curiously, it was not published by the government, but was a private venture of Billings and Fletcher, a labor of love done outside working hours. Its method of preparation is worth noting. According to Garrison, "The work of copying the library cards for redaction having been parceled out, as the celebrated Haller did with his eighteenth century bibliographies of medicine, among the wives and daughters of the office force, as private work" (9). This family business accomplished the job, but never made money. It was published precariously until

1899, when the financial losses became too large. After three years of silence,[3] the phoenix trick was performed with the aid of the Carnegie Institution. That Institution's interest in reviving the publication was largely due to the recognition by its President of the great bibliographical value of the *Index Medicus*. As you might guess, the President of the Carnegie Institution at that time was the ubiquitous Billings. It was the last contact he had with the *Index Medicus* and Fletcher, its other parent, resigned as editor in 1911. Fielding Garrison took over at Fletcher's request and the publication thrived. Our own *Current List of Medical Literature* is an oblique descendant of the *Index Medicus*.

Billings retired from the Army and the Library in 1895, just as the last volume of the first series of the *Index Catalogue* appeared. An estimate of his achievement is formed from the fact that when he arrived the Library contained just over 2200 volumes; when he retired the number had grown to 308,445 pieces. Even the detached view of man by the numbers ranks Billings at the top. And he was not through by any means. He went to the University of Pennsylvania as its first Professor of Hygiene, designed the first American clinical research laboratory for that University's Hospital and then moved on to New York to father the New York Public Library.

The Library survived Billings's departure. Fletcher continued on as Assistant Librarian until his death in 1912. His contribution was not underestimated even then. As for now, a recent memoir (10) considered him to be one of the few men who fit the description of the ideal librarian as a "saintly character with a keen interest not only in books but in their would-be readers whose time he saves thereby helping them, rather than himself, into print and prominence" (11).

The third of the Library's great men, Fielding Hudson Garrison, was to carry on for the next two decades. He is probably best known for his monumental book on medical history which he modestly titled *An Introduction to the History of Medicine*. However, it was the Surgeon General's Library which occupied most of his life and that Library was the better for it.

Despite the Depression, the Library celebrated its arbitrary centennial in 1936 with stylish splendor. Messages of congratulation and admiration were recorded from around the world, but affection blurred appraisal when the claim was made that the Library was the greatest collection of medical literature in existence. For the fact was that the Library was still traveling on the momentum provided by Dr. Billings, and that momentum was getting weak (12). Fortunately, the newly appointed Librarian, Colonel Harold Wellington Jones, had the proper misgivings. Through his efforts, a survey of the Library's condition was undertaken in 1943 and published in 1944 through the financial graces of the Rockefeller Foundation. Recommendations included recruitment of more and better qualified personnel, reorganization of departments, relocation of the rare book section and the restatement of an old problem in the dictum, "A new building is an absolute necessity" (13). Happily, the recommendations were heard and acted upon. The necessary new building was acted upon last because it cost the most—which satisfies one of Professor Parkinson's Laws. The survey had been firm on the problem of finances. The support of the Library was not something to be turned off and on like a faucet. "If the War Department is not ready to supply that support year in and year out, another sponsor must be found or the Library cannot remain a great one" (14). In the ensuing political pingpong, the Army Medical Library became the Armed Forces Library in 1952, and the National Library of Medicine in 1956. Its operation became the responsibility of the U. S. Public Health Service. Fortunately, the human element was not interrupted. The Librarian, Col. Frank B. Rogers, merely changed his uniform and his commission from the Army to the Public Health Service. It is noteworthy that Presi-

[3] During these three years, an inadequate substitute, *Bibliographia Medica*; *Index Medicus*, was published in France.

dent John F. Kennedy was co-sponsor of the Bill in the Senate which supplied the final impetus for this change. Ground on the southeast corner of the National Institutes of Health reservation in Bethesda was selected and the new building rose, a large and magnificent marriage of form and function. I can guarantee those of you who have not had the opportunity to see the new building that you won't be disappointed, and be sure to see it at night. I know of no other building in which lighting has been used with such dazzling effect. It was duly dedicated in 1961. At present, it is a happy combination of new services with old graces—for which the diverse readers who use it are most grateful.

Although it is no longer called the Library of the Surgeon General's Office or the Army Medical Library, it is still serving its original function as the National Library of Medicine, for its national character has always been clear, at least, in the mind of its maker. On the title page of the *Specimen Fasciculus* of 1876, Billings had written, "National Medical Library." I think even he would approve of its subsequent development.

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Extinct Medical Schools of Nineteenth-Century Philadelphia:

(VIII) Summary and Conclusions

By HAROLD J. ABRAHAMS, PH.D.

ONE may well ask the organic evolutionists to answer the question as to what function the dinosaurs served in acting as precursors of later forms of animal life. Did Nature experiment with these creatures, and, improving upon their limitations, bring into existence a better-adapted fauna? In the process of social evolution in general, and evolution of medical education in particular, did these extinct schools play any significant role in ushering in a better day? The answer is that they performed their functions as well as they might, with aftermath both good and bad.

As to the quality of these schools, the high water-mark seems to have been attained by the Medical Department of Pennsylvania College. The Philadelphia College of Medicine was also a meritorious institution, as was the very short-lived Franklin Medical College. The Penn Medical University was inferior in facilities and standards, by comparison with the "better" schools of medicine of our nation, but very notable because of its pioneering in co-ordinate medical education, and, what is at least as significant, if not more so, in the graded curriculum, as set forth in 1854, and announced as four "progressive courses", by Dr. Joseph S. Longshore. In this scheme the first course was largely elementary science, with some anatomy, the second included subjects now present in the early years of the modern curriculum of medical education, the third had elements of clinical subjects, and the fourth was devoted entirely to clinical subjects, hospital clinics and autopsies. Dr. Longshore's proposal antedates by many years the liberation of any American medical school from the old repetitive course, and by an even greater number of years the general adoption of the graded curriculum by the Association of American Medical Colleges. (It should be noted that the Philadelphia College of Medicine had somewhat similar thoughts on curricular reform at about the same time.) In the education of women for medical practice Penn Medical University became noteworthy for having graduated more such physicians (seventy or more), by 1864, than any other medical school. This school also supported the extension of the school term to a period of six months.

All of the schools in this study claimed to have adequate buildings and equipment, albeit the Penn Medical University admitted that it could not pretend that it had a magnificent building or large classes. In these attributes the leader was the Medical Department of Pennsylvania College, which, it was claimed, had the finest medical school building in America, especially designed for carrying on medical education.

As to curricular offerings, interesting items in the stated philosophies of the various schools are to be found. The Medical Department of Pennsylvania College, for example, frankly admitted that the lectures in chemistry were limited to that which was directly useful to a student of medicine, all other areas in chemistry being omitted. The same narrow view was taken by the Philadelphia College of Medicine. Franklin Medical College took a much broader view. At that school there was a thorough coverage of fundamental chemistry, due, perhaps, to the very high chemical attainments of Professors Rogers and Bridges. Laboratory work in chemistry, so newly introduced in American chemical education was early being carried on in some of these now-

extinct Philadelphia medical schools, which helped, to a degree, to erase the opprobrium that medical education in America was deficient in two things—1. training in chemistry, and 2. hospital practice. There were also to be heard new sounds, as the names of medical fields were read—Military Surgery (at the two Eclectic schools of Buchanan and Paine, respectively, in 1865 and after); Urino-Pathology (Paine, 1865); Malignant Diseases (Paine, 1866); Psychological Medicine (Buchanan, 1868); Drawing and Penmanship for medical students (Paine, 1868); other numerous specialties (throat, eye, skin, venereal diseases, etc.) at these two schools, around 1871. Evening classes in medicine, for workingmen who labored by day, were announced by the Eclectic Medical College of Pennsylvania (1878), which also announced a series of Centennial lectures, to be given by some of the eminent physicians who would be visiting Philadelphia in 1876. Also of interest are the two journals published by Buchanan and by Paine, and the claim, in 1865, that Paine's school had a chartered hospital all its own. (It has already been pointed out that all claims by Buchanan and Paine-Miller must be regarded with a measure of suspicion.)

The reasons for the rise of these schools vary widely. The Eclectics arose, of course, in order that they might propagate their medical ideals, and, in addition, to make available a medical education to persons who could not afford to study at more expensive schools. The Penn Medical University, named for William Penn, because its founders were Friends, (and not in imitation of the University of Pennsylvania), arose because of an interest both in medical education for women and in Eclecticism. It laid claim to being Eclectic in the purest sense, a system which never really obtained much of a footing in Philadelphia. Its standards were much higher than those of the other two Eclectic schools in Philadelphia. The Franklin Medical College felt that its existence was necessary because the city had drawn to itself so many medical students that classes had grown too large for good educational results, particularly in the demonstrative branches. It was also persuaded of the desirability of longer school terms, (two additional months). The founding of the Medical Department of Pennsylvania College resulted from the disagreement between Dr. George McClellan and the Jefferson College authorities which led to his dismissal, and his desire to establish a medical school along the lines which he had hoped the earlier one would follow. The Philadelphia College of Medicine arose, in part, as a natural outgrowth of a school of anatomy, which was run, with a high degree of success, by its founder, Dr. James McClintock, a brilliant anatomist and good organizer and promoter, who had already added lecturers on practice and materia medica to his staff. A feature which many students found attractive was the two-term system, each followed by a commencement. A student who wished to do so could meet the two-term requirement for graduation by attending the lectures in the months from Fall to Spring, inclusive, and be rendered ready to enter the practice of medicine in one year, thereby.

What was so painstakingly assembled, with sweating brow and hopeful heart soon disintegrated. In common with so many other medical schools which had arisen, like so many mushrooms, in the coastal cities, in the valleys of the piedmont, in the central states from Great Lakes to Gulf, and as far west as California, the extinct Philadelphia schools, independent as they were of collegiate mother-institutions, lacked the balance and stability which a group of experienced, well-connected and disinterested trustees could have given them.[1] The lack of financial stability was an especially marked and great disadvantage. The Medical

[1] Faculty ownership of the means of providing medical education was, in general, a dangerous thing, making possible exploitation for profit. In addition, the lack of a really effective presiding authority resulted in the absence of control over the dissentions, rivalries, envy, and differences in scientific opinion of the members of the Faculty of some of these schools. In addition, the lack of attachment to a liberal arts college or a university would have the tendency to put a medical school at a cultural and scientific disadvantage.

Department of Pennsylvania College, seemingly an exception concerning lack of ties with a college or university, was, in truth, virtually autonomous, deriving neither financial support nor serious helpful regulation from the college of arts and sciences to which it was nominally attached. Financial difficulties, due to the scattering of the students caused by the Civil War, brought about the demise of both this medical school and the Philadelphia College of Medicine, the school with which it merged. (The latter had earlier developed other financial trouble.) The same most probably applies to the Franklin Medical College, where enrollment was small. At Penn Medical University the Civil War brought about the atomization of the Faculty, the professors being scattered to the armies, and the students following suit. In addition, the prime mover of this school, Dr. Longshore, had grown gravely ill, and could not hold the college together. The other two Eclectic schools suffered from the quarreling of the two rivals, the decline of interest in Eclecticism as a philosophy of medicine,[2] the desire of graduates to be known as "regulars", the financial weakness resulting from the lower tuition rates, and the bad reputations resulting from the sale of bogus diplomas, in addition to the usual curse of almost all independent medical schools of that time. (The lack of state regulation also gave a helping-hand to the production of charlatans and quacks, which did additional damage to possible survival of the schools.) On the other hand, the Jefferson Medical College prospered throughout these times and even survived the great secession following John Brown's raid, in part because of the financial soundness, based upon the higher fees and the larger enrollment, in part because of the great distinction of its Faculty, wise administration, and wide-spread reputation for excellence.

The choice of a place for locating these schools fell upon Philadelphia in a most natural way.[3] Dr. M. L. North, writing three "letters" for the Boston Medical and Surgical Journal, Volume 26 (1842), on January 15, 22 and 29, from Saratoga, describes, in most glowing

[2] By 1882, of a total of 4,244 doctors who graduated in the United States in that year, only 288 were Eclectics.

[3] Among the reasons for the choice of Philadelphia as a city in which to establish new medical schools we may note the following:

a. The transition from a school for "private medical instruction", (i.e. anatomy or medical botany or materia medica), of which Philadelphia had many, to a collegiate institution was not too difficult. The Philadelphia College of Medicine and the Franklin College of Medicine sprang from the Philadelphia School of Anatomy. (For a brief discussion of such supplementary instruction in medical subjects being carried on in Philadelphia in the pertinent years, see *The North American Medico-Chirurgical Review*, Volume 1, (1857), pp. 948–9.)

b. Philadelphia had grown famous as a center of medical education, because of the presence of the school of medicine of the University of Pennsylvania and Jefferson Medical College. This would make a Philadelphia diploma, even if not from the University or Jefferson, sound impressive back home, among the unknowing.

c. The city would be a good place to establish a medical school because those students who wished to, could also attend one of the well-known "private medical schools" at the same time, or at the close of the college session.

d. The Eclectic schools may have located here in hopes of attracting students who were not able to do work of sufficiently high grade to remain at the better schools, and thus had to "drop out". (If the reason for establishing Eclectic schools in Philadelphia was to advance that movement, the aim failed its purpose, for Eclecticism never obtained any real footing in this city. Their personnel consisted of "free lances" from various sources. Eclectics were, however, according to their claims, more kindly disposed to research than were the members of the other schools.)

e. As Professor Shryock has pointed out in his *Medicine and Society in America*, the then-current efforts to pass laws requiring practitioners to be holders of the degree of doctor of medicine may have stimulated the growth of many medical schools, (Philadelphia included).

f. A charter was obtained from the Legislature in those days, without too great difficulty.

g. Clinical facilities were adequate in Philadelphia, and not in almost all other places, except, (later), in New York and Boston.

h. Anatomy was, in many places, taught by demonstration only, it being difficult, if not dangerous, to obtain material.

i. The general nation-wide tendency to overproduce physicians must have had an effect, even if indirectly. In 1848 the ratio of physicians to population was five times that of the ratio in France. By 1860 we had one

terms, the great advantages of studying medicine in Philadelphia. He says that about the first of November from seven hundred to one thousand medical students, strangers, would be seen, all at once, "traversing the streets and inquiring for the various medical offices" The influx of these persons had commercial and social impact. The students penetrated the lives of many families, and left many thousands of dollars in the hands of boarding-house keepers, public lecturers, book-sellers, private teachers and merchants. There was so much talk of doctors and of medical subjects, that even strangers could sense Philadelphia's general interest in medicine. "If we inquire how came the Philadelphians by these substantial perquisites, the answer is obvious; that it was because a band of distinguished medical men, whose names are familiar to all, took the lead of the whole country in medical instruction, and have managed, by means of their excellent institutions and successors, to keep it . . . no European physician could gain solid footing in Philadelphia until he had abandoned all pretentions to curing his patients by foreign systems . . . medical students that go abroad are forced to abandon mustaches, foreign frippery, and foreign systems, on their return, and adopt the methods and costumes of home." The third letter expresses highest praise for the clinical lectures at Blockley Almshouse and Pennsylvania Hospital, and mentions the many private institutions, dispensaries and specialties. Dr. North estimated that there were "twice as many out of the three colleges, (University of Pennsylvania, Jefferson and the Medical Department of Pennsylvania College) giving lectures and instruction as within them." He expressed the opinion that the foundations of medical science in Philadelphia were very deep, that very able men came here to win fame and fortune, and that the city would remain a leader in medicine for many years. He felt that those who had graduated in medicine many years ago could profit from a two- or three-weeks, or even an entire winter season's "pilgrimage" to Philadelphia, to hear the clinical lectures given in the city.[4]

One may wonder why students flocked here.[5]

physician per 572 persons, as compared with the 1938 figure of one per 764. (*Medicine and Society in America*, p. 147).

[4] Up to 1910, four hundred and fifty seven medical schools had been set up in the United States and Canada. Of these, one hundred and fifty five had survived to that date Some of the extinct schools had been run mainly for profit, and could be called "schools" only by courtesy. Nothing was needed but a Faculty, a cheap hall and rude benches. "Occasional dissections in time supplied a skeleton—in whole or in part—and a box of old bones", and there was practically no other equipment Professorial chairs were considered property to be purchased and sold—at one school the combined chairs of physiology and gynecology fetched $3,000, and the professor felt that he had been rooked when he found himself assigned to physiology alone, as he had expected to receive the benefits of the chair in gynecology as well. A student who had paid his tuition was practically assured of receiving his degree, irrespective of whether he had attended the lectures or not. "Even at Harvard, a student for whom a majority of nine professors voted was passed." (*Medical Education in the United States and Canada—A Report to the Carnegie Foundation . . .*, Abraham Flexner, 1910, pp. 3–19.)

[5] One example of the attitude prevailing in the home states of students who journied to Philadelphia to study medicine may be of interest:

In dealing with the general problem of educating Virginia youth, Dr. Samuel Maupin, Dean of the Medical Department of Hampden Sidney College, pointed out, in 1848, the advantages to a community of having its own institutions of higher learning, so that her sons may acquire the "elements of knowledge" at the parent source, and not by "transplantation", at a distant locality. He regrets that Virginians have had to study in other States, thus hindering the growth of scientific institutions at home, and quotes Thomas Jefferson, who wrote that there were, in 1821, probably 500 Virginians at Northern colleges, "imbibing opinions and principles in discord with those of their own country. This canker is eating on the vitals of our existence, and if not arrested at once will be beyond remedy."

The situation, as far as "academic" education was concerned, had been remedied by the establishment of the University of Virginia, but the problem as it related to medical education had not been solved. At Jefferson's university medicine was originally to have been taught as a branch of liberal education. One professor of medicine was appointed in 1825. For three years he lectured to small classes, after which period experience showed that it would be necessary to set up organized medical facilities, if adequate professional education were to result. Consequently a chair of anatomy and surgery

The lower fees which prevailed at some of the schools must have influenced many of them to select those schools, instead of the University of Pennsylvania or Jefferson. Students could learn about the schools from advertisements which the institutions ran in various journals, both near and far, (and from editorials) for example: *Charleston Medical Journal and Review*, (Vol. 4, p. 673, and Vol. 8, p. 576, to cite but two instances in this journal), *Nashville Monthly Record of Medical and Physical Science*, (1858), *Western Journal of Medicine and Surgery*, Louisville, Kentucky (Ser. 2, Vol. 5, pp. 452–3), *New Orleans Medical and Surgical Journal*, (ca. 1846), and *Western Lancet*, (1846–47). Shorter college sessions, so strongly criticised in the "Report of the Standing Committee on Medical Education," (see p. 738), in *Transactions of the American Medical Association*, Vol. 13, (1860), pp. 733–762, prevailed in many sections of the country, among them Philadelphia and New York. (This committee also bewailed the fact that the most striking causes of failure of candidates seeking appointments in Army and Navy medical divisions were the applicants' "insufficient preparatory education; a hurried course of professional pupilage; want of proficiency in practical anatomy, in pathology, and in clinical medicine.") The founders of some of the Philadelphia schools may have

was added in 1827, and materia medica, taught by the professor of chemistry, also appeared in the curriculum. There were now three professors for the entire medical department. Class enrollment rose from an average of 17, for the three years ending in 1827, to an average of 36 during the eleven years ending in 1838. During the first 14 years there was a total of 447 medical matriculates. Of these, 68 took the degree of doctor of medicine at the University, and a large majority of the remainder, it is believed, left the State, and graduated from Northern schools. Because of what Dr. Maupin calls a deficiency of "practical advantages" at the University, the great majority of the doctors of Virginia took absolutely no training in medicine there, attending Northern schools for their entire training, instead. To stem this tide, a medical school was organized in Richmond, in 1838, the plan resembling that of the Northern schools, and offering practical anatomy and clinical instruction. These improvements were followed by increased enrollments, the average of which, for the first ten years, was 65. Enrollment at the University's school did not suffer—there the enrollment averaged 53, for the ten years ending in 1848, as contrasted with an average of 36 for the eleven years ending in 1838. The 53 students annually attending in Richmond would have studied outside of the State, had this school not existed. This was all to the good, thought Dr. Maupin, except that the "canker" was still eating away—184 Virginians now being at the University of Pennsylvania and Jefferson, (during the last winter), and 40 more at the other schools of Philadelphia and those of New York, Baltimore, Louisville and Lexington. At $500 each, these students were taking $112,500 out of the State annually. Dr. Maupin then advanced the financial arguments to show how Virginia could make great progress in medical education, if the expenditures of Virginians studying out of the State over the period of the last forty years, plus the compound interest thereof, a sum exceeding $18 million, could be retained at home, and used to acquire apparatus and to attract superior professors. (Samuel Maupin, M.D., *Petition of the Medical Department of Hampden Sidney College to the General Assembly of Virginia*, Document Number 37, December 30, 1848.)

As a sequel we may examine an editorial in the *Maryland and Virginia Medical and Surgical Journal*, Vol. 3, (1854), pp. 86–88, which lists six reasons why Southern students study medicine in Northern schools. It expresses regret that, because of these considerations, more Virginians are studying medicine in the North than the "whole number of pupils in attendance on medical colleges in our State." The reasons given are:

a. The attractive pleasures of large cities.
b. The tendency of physicians to send their pupils to the same school which they themselves attended.
c. "The traditional excellence and sound doctrine of the 'old school' of Philadelphia."
d. "The rhetorical and operative display and facilities for obtaining diplomas at 'the Jefferson'."
e. The clinical advantages of New York.
f. The lack of cordial and unanimous support of a Virginia medical school by the profession.

(The demise of the Richmond school, for which Dr. Maupin had held such high hopes, had by now taken place, after a life-span of sixteen years, the causes being the indifference or hostility of some physicians, the charge that it was a private enterprise, an off-shoot of a sectarian academy, that it was a school with no legal claim to existence, that it was an impediment to reform, and that it was illiberal, monopolistic and inefficient. The editor held out great hopes for the newly organized Medical College of Virginia, which promised to be free of the faults of the earlier school.)

felt that students would be attracted to their institutions because they could return home with a diploma from a school located in this city, and create the impression, among friends and patients, that they had been trained at one of the more famous Philadelphia schools of medicine. Thus the inferior schools could capitalize on the good names of the better ones.

The text-books in use at the now-extinct Allopathic schools were, in good measure, although not entirely, the same as those at the University of Pennsylvania and at Jefferson. At the latter two schools the books in use in any give year included four or five written by members of each Faculty respectively. Many such books were in use at the now-extinct schools—works by Wistar, Smith, Horner, Wood (at Pennsylvania), and by Dunglison and Meigs (at Jefferson). The books in use at the last-named schools did not include works written by teachers at the extinct schools, but these, in turn, did have a few authors of their own—McClellan and Stillé, at the Medical Department of Pennsylvania College, before its merger with the Philadelphia College of Medicine, and Rand and Hartshorne after that event. The same can be said for the Philadelphia College of Medicine—Mitchell, Hartshorne and Meigs. At the Franklin Medical College the authors were Rogers and Clymer. Insofar as the Eclectic schools used books by Allopaths, many Philadelphia authors were represented—for example, Penn Medical's use of works by Stillé, Leidy, Wood, Smith, etc.

The three Allopathic extincts were later represented on the Faculties of the University of Pennsylvania and Jefferson—at Franklin, by John B. Biddle, at Jefferson; and Robert Bridges, Paul B. Goddard and Joseph Leidy at Pennsylvania; the Medical Department of Pennsylvania College, by Alfred Stillé at Pennsylvania; the Philadelphia College of Medicine, by B. Howard Rand at Jefferson. In the judgment of some persons, the Faculty of the Medical Department of Pennsylvania College "was superior to any other in Philadelphia"—(see: *Letters of Richard D. Arnold*, Letter to Dr. Alfred Stillé, page 93.[6] Provost Edgar F. Smith, of the University of Pennsylvania, once expressed the same opinion.[7] It must be remembered that in the late 1850's things were not going well for the School of Medicine of the University, and the Trustees admitted the gloomy turn which events had taken. Lecture tickets were reduced in price from $20 to $15, and the graduation fee from $40 to $30, because rival institutions were drawing away many students. For example, the medical school at Nashville had 442 students in 1859, while the University had but 409. Professor Cheyney, in his *History of the University of Pennsylvania*, (page 271), expresses the opinion that the Medical School had shown a decline in its position of preëminence and in the excellence of its teaching.

TABULAR SUMMARY OF THE RATES OF TUITION AT THE SIX EXTINCT SCHOOLS

	Matriculation fee	Lecture Tickets	Laboratory, Demonstration, Dissection	Graduation Fee
Medical Department of Pennsylvania College	$5	$15	$10	$30
Philadelphia College of Medicine	$5	Total of $84	$10	$30
Franklin Medical College	$5	$15	—	$10
Penn Medical University	$5	Total of $70	$5	$20
Eclectic Medical College of Pennsylvania	$5	$8	$5	$25
Philadelphia University of Medicine and Surgery	$5	Total of $70, including demonstration fee		$30

[6] *Letters of Richard D. Arnold:* Richard H. Shryock, editor, Papers of the Trinity College Historical Society, Durham, N. C., 1929. Letter to Dr. Alfred Stillé, p. 93.

[7] Personal communication from Dr. Richard H. Shryock, November 19, 1962, quoting a letter to him from Dr. Edgar F. Smith, as follows:

"Financial straits caused the Medical Department [of Pennsylvania College] to close its doors, which was very regrettable, because at the time, it was conceded to be the best medical school in the city."

TABLE SHOWING RATES OF TUITION AT TWO EXTINCT AND TWO SURVIVING SCHOOLS
(The importance of what seems to-day to be a small difference in costs is seen in clearer focus when it is borne in mind that "good board and lights" could be had for $2.50 or $3.00 per week.)

For two years, not including hospital and practical anatomy fees, which were optional:

Franklin Medical College	$210
Medical Department of Pennsylvania College	$215
University of Pennsylvania School of Medicine	$285
Jefferson Medical College	$245

The curriculum at each of the extinct Allopathic schools bore a close resemblance to that at the other schools and to that at the University of Pennsylvania. The same is true of the requirements for graduation.

NUMBERS GRADUATED BY THE VARIOUS PHILADELPHIA SCHOOLS IN THE FEW SELECTED YEARS SHOWN IN THE TABLE

	1850	1855	1860	1865	1870
Medical Department of Pennsylvania College	34	33	38	—	—
Philadelphia College of Medicine	67	27	—	—	—
Franklin Medical College	10 (1848)	—	—	—	—
Penn Medical University	—	1	17	25	—
Eclectic Medical College of Pennsylvania	—	4 (1854)	8 (1863)	30	Statistics not trustworthy
Philadelphia University of Medicine and Surgery	—	—	24	30	
University of Pennsylvania School of Medicine	176	170	167	123	113
Jefferson Medical College	211	212	170	136	160

Taken on balance, the extinct Allopathic schools of Philadelphia did creditable work, and one may speak of them in terms of the Pharaoh, on the walls of whose burial-chamber appears the apostrophe: "Ho, King Unis. Thou didst not depart dead. Thou didst depart living!" For, despite the "immortal bard", the good has not been interred with their bones. When, however, one reflects upon the Eclectic schools of Buchanan and Paine-Miller, and the chronicles of their post-bellum days, there come to mind the words of Alfred Noyes:

"O, what does it mean, all the pageant and the pity,
The waste and the wonder and the shame?"

Were it not better that the two schools had never arisen?

ACKNOWLEDGMENTS

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Memoir of John Albert Kolmer 1886–1962*

By LOUIS TUFT, M.D.

DR. JOHN A. KOLMER, a founder and emeritus director of the Institute of Public Health and Preventive Medicine of Temple University, died in his office of coronary thrombosis on December 11, 1962, at the age of 76. He was born in Lonaconing, Maryland, on April 24, 1886, of German parentage. Unable to finish high school because of economic conditions at home, he won a competitive state scholarship to Charlotte Hall Military Academy at age 16 and graduated in June, 1904, with highest honors and seven gold medals.

He entered the Medical School of the University of Maryland in September, 1904. At the end of the first year he transferred to the Medical School of the University of Pennsylvania from which he graduated in June, 1908, having won the Packard Prize in Clinical Medicine.

He interned at St. Vincent's Hospital, Philadelphia, where he conducted his first research on the blood changes in whooping cough and established a procedure which still is used for the early diagnosis of that disease. He then interned for another year at St. Agnes Hospital, during which time he collaborated with Dr. Jay F. Schamberg and Dr. Joseph Goldberger in the discovery of grain-itch, a hitherto unknown disease of the skin.

In 1910 he accepted an internship at the Philadelphia Hospital for Contagious Diseases. Six weeks later he was appointed Assistant Bacteriologist to the Bureau of Health and subsequently became Pathologist at the hospital, a position he held for several years. During that period he took graduate courses in public hygiene at the University of Pennsylvania and was awarded a degree of Doctor of Public Health in June, 1914. From 1914 to 1919 he served as Assistant Professor of Experimental Pathology in the undergraduate school of the University of Pennsylvania School of Medicine under Dr. Allen J. Smith, a loyal and devoted friend. In 1919, Dr. Kolmer left the undergraduate school to become Professor of Pathology and Bacteriology in the Graduate School of Medicine of the University of Pennsylvania, with which he had been associated since 1912. He also was appointed Director of the Clinical Laboratories of the Polyclinic Hospital. In 1930 he became associated with Temple University School of Medicine, first as Professor of Chemotherapy, and in 1932 as Professor of Medicine in charge of Bacteriology and Immunology, a position he maintained until his elevation to emeritus standing in 1957. From 1936 to his death, he also served as Professor of Medicine in the Temple University School of Dentistry.

In 1912 Drs. Kolmer and Schamberg organized the Dermatological Research Laboratories at the Philadelphia Polyclinic, where they conducted research into diseases of the skin, especially psoriasis. In 1914, together with Dr. George W. Raiziss, they became the pioneer American investigators in the new science of chemotherapy. They were the first in the world, other than German investigators, to prepare the famous "606", or salvarsan, discovered by Ehrlich. During the First World War, when this remedy for the treatment of syphilis was unavailable in the United States, these laboratories became the sole source of its supply not only for the Armed Forces and the Public Health Service but also for the civilian population, and they were able to save the Government more than a million dollars. The

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profits from the sale of these drugs together with the money derived from the sale of the Dermatological Research Laboratories to the Abbott Company was used to found the Institute of Cutaneous Medicine, located at 2101 Pine St., which soon became the leading research center in Philadelphia and among the best in the world. In 1949 the Institute became part of the Medical School of Temple University; and with Dr. Kolmer at its head was known as the Institute of Public Health and Preventive Medicine.

Dr. Kolmer had a distinguished career as a scientist, investigator, author, teacher, and physician. As a *scientist* and *investigator*, he published more than 600 papers devoted to research in the cause, prevention and treatment of diseases with special reference to bacteriology, immunology, and chemotherapy. A pioneer in the science of chemotherapy, he contributed immeasurably to the development of the modern treatment of syphilis, highly fatal types of meningitis, the septicemias, and other virulent bacterial diseases. He was the first in the United States to vaccinate against scarlet fever and among the first to employ the Schick test in diphtheria. He was the first in the world to discover agglutinins for Spirochaeta pallida and was one of the few who succeeded in cultivating this parasite.

In 1920 he completed a remarkable series of investigations into the Wassermann reaction which resulted in the discovery of the Kolmer test for syphilis, recognized by the U. S. Public Health Service and widely employed in this and other countries as one of the standard approved methods for the detection of this disease. Dr. Kolmer also was a special consultant to the National Government on the serology of syphilis. The more recent Kolmer-Reiter antigen used in the Treponema pallidum complement-fixation test also bears his name.

In 1934 he received national and international recognition for his research work on vaccination against infantile paralysis. Convinced by the results of expensive and laborious studies in monkeys that an effective vaccine must contain living virus, he risked his life by subjecting himself and his two children to injections of the vaccine. Only after determining that it produced no ill effects was he willing to consent to its administration to others in response to a heavy and insistent demand. Unfortunately, the occurrence of a few cases of the paralytic form of the disease among more than 12,000 vaccinated children provoked unfavorable publicity as well as the personal animosity of certain other investigators. Dr. Kolmer decided, therefore, to discontinue further investigation of this treatment even though he at that time was very close to the discovery of a vaccine which antedated by many years the same type of vaccine, namely the Sabin vaccine, now so successfully used in the prophylaxis of paralytic poliomyelitis.

Dr. Kolmer was a prolific *writer*, not only of articles but of numerous text-books which went through repeated editions. His books include the following: (1) "Infection, Immunity and Biologic Therapy," which went through several editions and became the microbiologist's and immunologist's "bible." It later was rewritten (with Louis Tuft) under the title "Clinical Immunology, Biologic Therapy and Chemotherapy." Other text-books by Dr. Kolmer included: (2) "Chemotherapy with Special Reference to the Treatment of Syphilis," (3) "Serum Diagnosis by Complement Fixation," (4) "Approved Laboratory Technic," first with Frederick Boerner, later with Earle H. Spaulding and Howard W. Robinson, (5) "Acute Infectious Diseases," with Dr. Schamberg, and finally (6) "Clinical Diagnosis by Laboratory Examinations." These books are extensively used by teachers and practitioners all over the world.

As a *teacher*, both in the Graduate School at the University of Pennsylvania and at the Temple University Medical Center, he won national reputation as a lecturer and clinician. Endowed with unusual ability for conciseness and clarity of instruction, he was regarded as one of the great teachers in Philadelphia and was widely in demand for lectures and clinics

throughout the United States. To satisfy the growing need for laboratory technicians, Dr. Kolmer was the first in the world to establish a school for their adequate instruction in the Philadelphia Polyclinic, which led to the establishment of numerous similar training schools all over the country. He was also among the first to recognize the need not only for including instruction in clinical medicine in the education of the modern dentist but also for the need for teaching medical students certain aspects of dentistry.

As a *physician*, Dr. Kolmer was in constant demand all over the country as a consultant not only in syphilis and in the intractable dermatologic disorders but especially in the diagnosis and treatment of the more dangerous bacterial diseases. He made news when he was called to the White House in Washington in 1924 to help in the care of the 16-year old son of President Coolidge in what proved to be a fatal illness, namely septicemia. Later, Dr. Kolmer's monograph on penicillin therapy (1945) was dedicated to his friend Sir Alexander Fleming.

During his lifetime Dr. Kolmer participated actively in many medical societies devoted to bacteriology, immunology, and clinical pathology. He served as president of their organizations and was one of the founders of the American Society of Clinical Pathology. He became a fellow of the Philadelphia College of Physicians on June 3, 1914. A diplomate of the American Board of Pathology, he was also a fellow of the American College of Physicians.

Recognized by the honorary degrees of Master of Science, Doctor of Science, Doctor of Laws and Doctor of Humane Letters by Villanova, by St. Joseph's, and by LaSalle Colleges, he was also the first recipient of the Mendel Medal awarded by Villanova College (1929) in recognition of his work as an investigator, teacher, author and physician. He was the recipient of the Strittmatter Medal of the Philadelphia County Medical Society (1932) for the same reasons, and of the Ward Burdick Medal of the American Society of Clinical Pathologists (1934) in recognition of his investigations into vaccination against infantile paralysis.

A devoted husband and father, modest and retiring in manner, he was an indefatigable, hard and unselfish worker. He had no special hobbies except as a spectator at baseball and football games. For some years he served as team physician for the Villanova football team and derived much pleasure from this association. His notable accomplishments in the medical field brought him national and international reputation. Few have brought more renown and honor to medicine or have contributed more to the reputation, advancement of knowledge, and to the high position of Philadelphia in the history of medicine. Dr. Kolmer leaves behind him an outstanding and enviable heritage.

Memoir of Paul Christian Swenson 1901–1962*

By LEWIS C. SCHEFFEY, M.D., SC.D. (HON.), L.H.D. (HON.)

THE death of Paul Christian Swenson on December 15, 1962, ended a long and distinguished career as a teacher of hospital residents and medical students and of service to patients. His entrance into the specialty of Radiology was one of chance. In 1927 he was practicing in Duluth, Minnesota, as one of a clinic group of five members. To improve their diagnostic capabilities, they purchased radiographic equipment and selected him to "run the x-ray machine." He started with a few books and no background, but before long was performing satisfactorily with the assistance of a nearby radiologist. He soon felt the need for formal training and subsequently he was selected for a residency in a teaching hospital.

Dr. Swenson was born in Duluth, Minnesota on May 3, 1901. He received the degrees of Bachelor of Science (1923), Bachelor of Medicine (1925), and Doctor of Medicine (1926) from the University of Minnesota. After an internship and one year of private practice, he began his residency in Radiology at the University of Michigan Hospital. When this was completed he received an appointment as Instructor in Medicine at the College of Physicians and Surgeons, Columbia University. He held subsequent appointments in Radiology at the same institution until 1943. At this time he was an Associate Professor. Dr. Swenson was then appointed Professor and Director of the Department of Radiology at the Jefferson Medical College and Hospital. He remained with these institutions until 1955 and then entered the private practice of Radiology in Philadelphia. He subsequently was in private practice in St. Paul, Minnesota. He held the appointment of Clinical Professor of Radiology at the University of Minnesota until 1960. His final position was that of Chief of the Radiology Service at the Veterans Administration Hospital in Columbia, South Carolina.

His contributions to medical science were numerous and particularly devoted to radiological diagnosis. His major research interests were in mass surveys of the stomach and in obstetrical radiology. He clearly established, in association with Doctors William E. Caldwell and Howard C. Moloy, that although one cannot minimize the value of accurate measurements of the pelvis, an obstetric prognosis is determined from the information gained from the roentgenograms of the fetal head and entire maternal pelvis, rather than on the basis of any particular pelvic diameter. All factors were considered: the correlation of the size with the shape of the pelvis, the size and position of the fetal head, and the correct adaptation of one to the other in the mechanism of labor.

In 1944, he reported the results of rapid roentgenoscopic surveys of the stomach that he had performed in 2,413 persons in whom there were no appreciable digestive symptoms. Two carcinomas and one lymphosarcoma were uncovered. All lesions were resectable. Both patients with carcinoma lived over five years. After this indication of a silent period for gastric carcinoma was established, numbers of others, as well as himself, continued this important work, utilizing photofluorographic methods. Much of his research was presented in texts, as well as in professional journals. Over 40 of his articles were published.

"Paul's boys" number over fifty of his former residents. He constantly taught that there is "never an always and always a never." He emphasized that the "corners of the films"

* Prepared and published at the request of the Council of The College of Physicians of Philadelphia.

may be the most important parts in diagnosis. He taught house officers, not by rote, but by observatory periods. He established in them an early sense of responsibility, tempered by self-imposed restrictions. Dr. Swenson had an amazing memory. He delighted friends with his facility to recall amusing incidents of the past, relative to the present moment, and with his inexhaustible warehouse of humorous anecdotes.

Paul Swenson belonged to varied organizations, both local and national. He held office in many of them at one time or another. Philadelphians derived deep satisfaction from his activities as President of the Philadelphia Division of the American Cancer Society. He served as President of the Philadelphia Roentgen Ray Society. He was elected a Resident Fellow of the College of Physicians of Philadelphia in October 1944 and transferred to Non Resident Fellowship in January 1959.

So many of us regret his passing; so few of us returned his favors. Dr. Swenson made a deep impression upon the people associated with him, everywhere. Not only has the medical profession lost a great physician, but also a true and admirable friend. Dr. Swenson is survived by Ruth Kathryn, his devoted wife, and by his sons, Paul Richard Swenson, of New York City, and John Arnold Swenson, M.D., of Miami, Florida.

Memoir of Henry Pleasants, Jr. 1884–1963*

By WILLIAM A. LIMBERGER, M.D.

DR. HENRY PLEASANTS, JR. was born in Radnor, Pennsylvania on May 23, 1884, the son of Henry and Agnes (Spencer) Pleasants. He was graduated from Haverford School in 1901 and received his A.B. degree from Haverford College in 1906. While in college, he was captain of the Inter-Collegiate Champion Soccer Team in 1905 and played Cricket on the Haverford team which toured Nova Scotia and England. He received his medical education at the University of Pennsylvania, graduating in 1910. Dr. Pleasants started in the general practice of medicine in West Chester in 1911, being appointed to the Medical Staff of the Chester County Hospital in the same year. He served as Chief of the Diabetic Clinic of the Chester County Hospital from 1934–1938, and as Chief of a Medical Service from 1934 to 1944. In 1946 he served for one year as Chief of the Medical Staff of the Chester County Hospital.

During the First World War, Dr. Pleasants served with the 77th Division of the A.E.F. in France as a Major, receiving the Victory Medal with two stars and the Order of the Purple Heart. In 1954 he retired from the A.U.S. as a Lieutenant Colonel. He was very active in the Military Order of Foreign Wars, serving as Commander of the Pennsylvania Commandery and as Registrar General of the National Organization. He was a Life Member of the Association of Military Surgeons. As Chairman of the Medical Aid Committee of the Department of Pennsylvania from 1925 to 1928, and, as a member of the National Rehabilitation Committee of the American Legion in 1929, he was greatly interested in the activities of this organization.

From 1927 to 1937 he was Attending Physician to the Church Farm School; from 1940 to 1943 he acted as Medical Director of the West Chester State College and he was Attending Physician at the Marshall Square Sanitarium in West Chester from 1943 to 1946.

Always interested in public health, Dr. Pleasants served as editor of *Pennsylvania Health* (1941–1942) and as a member of the West Chester Board of Health from 1940 to 1961. From 1942 to 1945 he served as secretary and from 1958 to 1961 as president of the latter organization. In 1949 he retired from the active practice of medicine to assume the position of District Medical Director for Chester County in the Pennsylvania Department of Health, holding this position until 1957.

Throughout his life he was a member and took an active part in many civic, health, and welfare organizations. He served as a member of the Council and as president (1946 to 1947) of the Chester County Art Association; as a director of the West Chester Health and Welfare Council; as a member of the Advisory Board of the West Chester Social Service Society; as a member of the Chester County Historical Society and as chairman of the Chester County Committee of the Sesqui-Centennial on the Ratification of the Constitution of the United States (1938).

Dr. Pleasant's professional memberships included: Fellow of the American College of Physicians, the College of Physicians of Philadelphia, the Chester County and Pennsylvania Medical Societies, the American Medical Association, the American Public Health Association, and the American Society of Sanitary Engineers.

From early manhood he was interested in writing and ably edited the journal *Medical World* (1934 to 1936). In 1916 he edited *Memoirs of a Physician*, (Verresayev). He

* Prepared and published at the request of the Council of The College of Physicians of Philadelphia.

wrote other books which were mainly historical in nature, several of these dealing with the Civil War. His best known book was a story of medical practice in West Chester—*A Doctor In The House*.

Married in 1909 to Elizabeth W. Smith, he is survived by four children of this marriage. In 1932 he married Vera M. Kilhefner, his widow and daughter living at 18 West Chestnut Street, West Chester. Dr. Pleasants kept quite active in his later years, dying suddenly on February 7, 1963.

It was my privilege to be associated in the practice of medicine with Dr. Pleasants for three years when I first started in West Chester, and I shall always be grateful to him for his kindly guidance and help during those years.

Memoir of Francis Sidney Dunne 1903–1963*

By FRANKLIN L. PAYNE, M.D.

DR. F. SIDNEY DUNNE was born in Ottawa, Ontario, Canada on November 4, 1903. He lived a full personal, professional, and religious life and died in Philadelphia on February 13, 1963. His death was a deep loss to his colleagues, both personally and professionally.

He was graduated in medicine from McGill University in 1927 and served a year's internship in the Brigham Hall Hospital, Canandaigua, New York. This was followed by his residency training in Obstetrics and Gynecology at the Royal Victoria Hospital in Montreal, the Hospital of the University of Pennsylvania, and the Pennsylvania Hospital from 1928 to 1932.

Immediately thereafter he received staff appointments in his chosen specialty to both the latter institutions as well as to the Philadelphia General Hospital. Having chosen Philadelphia for his home, he became a naturalized American citizen without delay.

Early in his training he evinced great interest in, and aptitude for, obstetric-gynecologic pathology. Dr. Charles C. Norris influenced him greatly in this field, and they were closely associated from 1932 to 1941. Dr. Dunne was recognized as an authority in tissue pathology, made numerous contributions to the literature and kindly tutored many doctors in preparation for their Specialty Board Examinations. Throughout his career he excelled as a teacher, not only of pathology but of clinical subjects as well, being interested in students at all levels of training, from the undergraduate to the specialist.

Dr. Dunne was a member of the Philadelphia County Medical Society and the parent State and National Societies as well as the American College of Obstetricians and Gynecologists. He was certified by his specialty board in 1940, became a member of the Philadelphia Obstetrical Society in 1933 and served as its president in 1947. His presidential address on intraepithelial carcinoma of the uterine cervix, a new subject at that time, was a masterpiece long to be remembered. He was invited to become a member of the College of Physicians of Philadelphia in 1951 and continued this membership in good standing until his death.

Dr. Dunne was advanced in academic position from Instructor in Obstetrics and Gynecology, Medical School of the University of Pennsylvania, in 1932, to Assistant Professor of Obstetrics and Gynecology in 1953, a post that he held until his death.

He was married to Miss Pearl Knier in September 1936. A daughter was born of this marriage three years later. Mrs. Dunne died youthfully and tragically nineteen years following their marriage. Some years later he met and married Miss Lillian St. Dennis who survives him along with his daughter, Mrs. Frank Potere and two grandchildren.

Dr. Dunne's avocations were his family, his many friends, occasional golf, and fishing trips. While he was deeply but not ostentatiously religious, his adherence to the tenets of his faith was tempered by his medical judgment and his conscience as a physician.

He will long be remembered for his love of family and fellow-man, and for his eagerness to advise and teach his colleagues—in that area of which he was a master—tissue pathology. Each of his close professional associates will have either made or heard the statement: "We had better get Sid Dunne to study that slide". That skill, generously shared, and the substantial contributions to his field will not be forgotten.

* Prepared and published at the request of the Council of The College of Physicians of Philadelphia.

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John Coakley Lettsom and English Medicine in the Georgian Period[1]

By Edward Rose, M.D.[2]

THE medical career of John Coakley Lettsom, extending through the latter half of the eighteenth and the first fifteen years of the nineteenth century, reflects the color of English medicine in the later Georgian period. The evolution of nosology and of concepts of pathogenesis was then still in an early stage. The prolonged twilight of mysticism, superstition and dogmatic obscurantism which followed the brilliant contributions of Hippocrates had been illuminated by John Locke and Thomas Sydenham only a century earlier. While some further efforts at a rational classification of disease had been continued by DeSauvages in France and Linnaeus in Sweden, a clear understanding of pathological physiology and morbid anatomy and their relation to clinical medicine still awaited elucidation by the French school in the early 19th century. There were, nevertheless, sporadic observations and discoveries of lasting importance during this otherwise fallow period in western medicine—the introduction of percussion by Auenbrugger, Withering's discovery of the effects of foxglove, Jenner's development of vaccination, and notable descriptions of disease entities by such astute observers as Heberden, the Hunters, John Fothergill, and Percival Pott. The practice of medicine and surgery was still loosely regulated and almost anyone who chose could practice the healing arts. In this environment charlatans were notoriously numerous and prosperous. The apothecary filled the role of the general practitioner; obstetrics was largely in the hands of midwives; and the surgeon was little more than a technician, usually subordinate to the physician. The physician with a medical degree occupied an exalted position both in his profession and in society. As a consultant, teacher, and member of a hospital staff he was usually prosperous, distinguished by his rich dress and the gold-headed cane emblematic of his calling. Physical examination of the patient was rudimentary, venesection was considered almost a panacea, and most of the pharmacopoeia exerted little more than psychological effect.

Lettsom was born of Quaker stock in 1744

[1] Kate Hurd Mead Lecture in History of Medicine XVI, Woman's Medical College of Pennsylvania and The College of Physicians of Philadelphia, 21 April 1964. Some of the material contained in this lecture was presented in an address to the American Clinical and Climatological Association, 24 October 1962.

[2] Professor of Clinical Medicine, University of Pennsylvania School of Medicine, Philadelphia 4, Pennsylvania.

in the Virgin Islands, where his father was a planter. He was sent to England at an early age, where his education was continued under Quaker influence and where he attracted the attention of Samuel Fothergill. After several years' apprenticeship with a Yorkshire apothecary he continued his medical education at St. Thomas' Hospital in London, where he enjoyed the patronage of the celebrated physician John Fothergill, brother of Samuel. After a brief sojourn in his native island, where he accumulated a substantial competence from practicing medicine for about six months, he returned to England and spent a winter studying under the famed William Cullen at Edinburgh. He then traveled in Europe and obtained his M.D. degree at the University of Leyden in 1769.

After his marriage to a young Quaker lady of substantial fortune he began the remarkable career which was to span more than four decades and which was marked by extraordinary energy, industry, and constructive interest not only in medicine but in all matters pertaining to the public good. He rapidly acquired a large practice and soon became one of the most popular consultants in the London area, having been accorded consulting privileges within a seven mile radius of London upon becoming a licentiate of the Royal College of Physicians in 1770. The demands of his heavy practice often kept him away from home for days on end, and he spent much time traveling in his coach, where he seized the opportunity to arrange his extensive collection of clinical notes and to carry on the enormous correspondence which he maintained for many years with correspondents in England, the European continent, and America. In addition to his town house in Basinghall Street, he maintained an elaborate country estate at Camberwell, and with his gregarious instincts became a popular host. Although he adhered faithfully to the tenets of the Quaker faith, he enjoyed company and social intercourse and moved in the upper circles of English professional and social life.

His voluminous writings covered a broad range of subjects, of interest both to the laity and the medical profession. His writings on tea-drinking received wide notice, and he wrote an interesting *History of the Origin of Medicine* (1778). Most of his publications were of ephemeral and topical interest, but he contributed an original description of alcoholism which is outstanding as an example of astute clinical observation. He was a friend of Benjamin Franklin and corresponded with other notable Americans, including Nathan Smith, the celebrated New England medical educator, Benjamin Rush, and Benjamin Waterhouse, the pioneer of smallpox vaccination in North America. He contributed a collection of mineral specimens to Harvard College, and was a corresponding member of several American medical organizations, including the College of Physicians of Philadelphia and the Philadelphia Medical Society. He was also a corresponding member of the American Philosophical Society, where some of his memorabilia are preserved. He was consulted in the collection of the medical library at the Pennsylvania Hospital. A visit to Lettsom was considered an essential part of the English education of every young American physician who traveled to the mother country.

He was actively interested in prison reform, and advocated improvements in prison hygiene which unfortunately were not implemented until many years after his death. He gave generously of his time and money to the indigent and was instrumental in the establishment of the Aldersgate Dispensary which continued its independent existence until it was merged with Saint Bartholomew's Hospital in 1932. He was active in the establishment of the Medical Society of London (1773), one of the earliest surviving organizations of its kind in the British Isles. He established the Fothergillian Medal of this society, which was awarded annually for the best dissertation on a topic to be selected by the Society, and won the award himself in open competition in 1791 with a voluminous treatise entitled "Diseases of Great Towns and the Best Means of Pre-

venting Them". He took active interest in the Royal Humane Society, which had been founded earlier for the promotion of the resuscitation of the drowned, and which was responsible for many rescues.

During the long and bitter controversy which raged about inoculation with smallpox virus, Lettsom mistakenly advocated mass inoculation, which was undoubtedly responsible for a number of epidemics. His chief opponent was the celebrated Baron Thomas Dimsdale, who advocated selective inoculation under precautionary isolation. Their argument was carried on through the medium of pamphlets and extended over several years. However, Lettsom instantly recognized the worth of Jenner's classical contribution, which was published in 1798, and thereafter became an earnest advocate of vaccination and an ardent supporter of Jenner in the numerous controversies which followed.

Perhaps Lettsom's most enduring contribution was his devoted leadership in the establishment of the Royal Sea Bathing Hospital at Margate. He was a leader in the planning, construction and operation of this hospital, which was opened in 1796 and was the first establishment of its kind devoted to the treatment of disease by fresh air and sunshine. As his biographer Abraham says, it matters not that Lettsom was under the erroneous belief that the salutary results were due to bathing in sea water rather than to exposure to fresh air and sunshine, and he deserves credit as a pioneer in this form of therapy. The Royal Sea Bathing Hospital has remained in continuous operation to the present time and is now devoted chiefly to the treatment of tuberculosis and other pulmonary diseases, as well as arthritis.

Lettsom's indefatigable energy and industry were in sharp contrast with the leisurely tempo of his times. His only annual vacation consisted of an inspection trip to the Royal Sea Bathing Hospital at Margate. Even this was fully occupied by the arduous 144 mile round trip by coach, and by inspection of the hospital and board meetings as well as frequent consultations in the vicinity. Although saddened by the untimely death of his oldest son and burdened by financial reverses which were later recouped, Lettsom pursued his multifarious activities with characteristic energy until a few days before his death. This occurred in 1815, doubtless as a result of septicemia acquired during a necropsy. Many of his numerous descendants contributed to the glory of the British Empire as colonial administrators, diplomats, merchants, and soldiers. While he cannot be counted as one of the great figures in Georgian medicine, Lettsom was certainly one of the notable actors in the colorful pageant of 18th century England. His energy, diversity of interests and talents, and his dedication to the common good would have distinguished him in any company. It is therefore somewhat ironical that he should now be best remembered by a bit of doggerel, the most authentic version of which runs as follows,

"When any sick to me apply,
I purges, bleeds and sweats 'em.
If after that they choose to die,
Why verily! I. Lettsom."

An Evening on the Ear[1]

By Howard P. House, M.D.[2]

YOUR great City of Philadelphia is known the world over for its outstanding citizens, many of whom will remain etched forever on the bronze tablets of history. It is most fitting that we gather here this evening to pay tribute to still another of Philadelphia's distinguished citizens—Dr. George Morrison Coates.

In the year 1876, when our citizen of the evening was but two years of age, Alexander Graham Bell invented the telephone. It was while he was a sophomore in medical school here at the University of Pennsylvania some twenty years later, that Marconi invented the wireless. Indeed Doctor Coates grew up, so to speak, in an era of momentous developments in the field of communication.

Is it any wonder then that Doctor Coates played such an important role in communicating otolaryngologic developments to the world?

My first contact with the name of "Coates" came during my junior year in medical school when it was suggested that I spend what I thought to be a rather large sum for the Jackson-Coates textbook of otolaryngology "The Nose, Throat and Ear and Their Diseases". This expenditure, however, proved to be one of my finest investments, for it was subsequently my constant companion as a medical student, an intern and later as a resident in otolaryngology. It will forever remain as a prominent member of my medical library.

The editorial activities of Doctor Coates resulted in a five volume publication of the finest up-to-date reference that we have today in otolaryngology. As though this were not an adequate demonstration of this man's ability to communicate, he also found time and energy to serve as the Editor of our widely distributed journal, the Archives of Otolaryngology.

I was first introduced to Doctor Coates by my mentor and chief, Doctor J. MacKenzie Brown, at an Academy meeting in 1938. Little did I foresee the role that this quiet, reserved, and distinguished gentleman would play in my life, the lives of all otologists, and the lives of so many grateful patients the world over. It was this gentleman who so valiantly held off the numerous outspoken critics of the day and indeed there were many, and thereby made it possible for the work of Julius Lempert to be presented and published so that the seed of modern otology could flourish. Through this great effort, the man we honor this evening brought communication to thousands throughout the world so that they could enjoy the momentous discoveries of Bell and Marconi and live in a world of sound.

And so, Doctor George Morrison Coates, is it any wonder that we are gathered together this evening to pay tribute to your role as an educator, a scientist, a devoted husband, a fond father, and above all a true gentleman dedicated to his fellow man through communication?

In speaking of Alexander Graham Bell, we think not only of the telephone, but also of the hearing aid, for he played a most important role in the early development of the electronic hearing aid. Just as the telephone has advanced, so has the hearing aid, and we indeed owe a great debt of gratitude to the electronic age in which we live. To trace the development of the hearing aid throughout the years is indeed most fascinating (Figs. 1–5).

The ability to communicate is indeed a

[1] George M. Coates Memorial Lecture II.

Presented before the combined session of the Philadelphia Laryngological Society and the Section on Otolaryngology, The College of Physicians of Philadelphia, January 9, 1964.

[2] From the Otologic Medical Group and From the Department of Otolaryngology, University of Southern California School of Medicine. Sponsored by the Los Angeles Foundation of Otology.

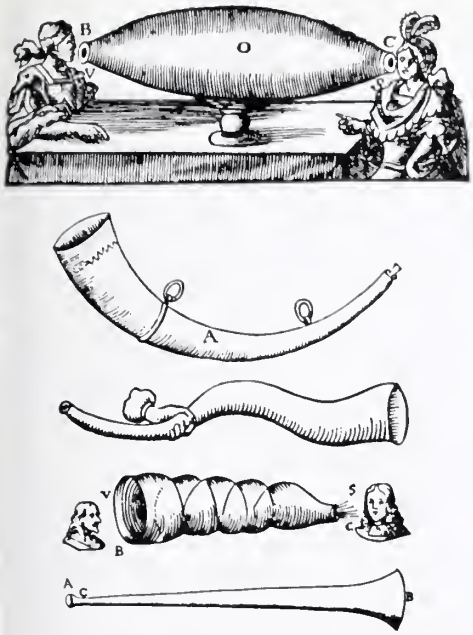

Fig. 1. Earliest hearing aids (1650)

precious commodity that cannot be bought, sold or exchanged. It is estimated that some 18 million people throughout the United States have some degree of hearing impairment. This means that one out of every ten persons in this audience this evening may well have some degree of hearing impairment. I might add if you do not have this problem at the moment, do not give up hope, for you may well live to see that day. Great advances have been made in otology and its allied fields, and, as a consequence, numerous medical, surgical and rehabilitative measures are available today to help this large segment of our population. It is your duty and mine to guide the destiny of these individuals and to see that they have available to them all that modern otologic development can offer.

The stress of living in a world of tension is indeed taking a frightful toll of normal hearing individuals. This is evidenced by the ever-increasing need of institutions of mental health and the personnel to staff them. Imagine adding to this normal stress the problem of inadequate sound awareness and communication. The person with a hearing impairment is under constant stress and pressure from morning until night, remaining excessively alert and tense in order to recognize the sounds of encroaching danger and to communicate with his fellow man. These people often obtain little rest, even during their sleeping hours, always remaining unconsciously fearful that baby cries may remain unheard, or that the crackling of fire, or other encroaching danger signals may go unheeded.

The ear was first used as an alerting mechanism by prehistoric man. The rustle of a leaf by an approaching animal often meant survival in these early days. It is difficult to conceive how this delicate organ mechanism of hearing can so beautifully withstand the onslaught of the noises encountered in today's jet age. Have you ever paused to define noise? What is noise? Well, noise is nothing more, or nothing less than unwanted sound. The party next door at two o'clock in the morning is music to them, but noise to you as you fitfully attempt to get a night's sleep. If your home is on fire, the approaching fire trucks are music to your ears, but if the fire is elsewhere, this atrocious sound is nothing but noise when it disturbs your well-

Fig. 2. Acoustical chair

Fig. 3. Acoustical cane

being. This unique difference between noise (unwanted sound), and wanted sound is, of course, differentiated in the brain.

Hearing loss usually develops insidiously. The person involved is often not aware of his difficulty. Those around him consider him to be somewhat prudish and perhaps even stupid, and they show little or no sympathy. As the hearing loss progresses, the individual becomes more aware of his problem. Anxiety, tenseness and fatigue begin to take their toll. The person tends to withdraw from social contacts and may develop an inward complex of persecution. This is aggravated by the lack of understanding and sympathy exhibited by his social and business contacts.

Untiring efforts must be made to clarify the psychological understanding of these persons, both within themselves and with their associates in order to improve their lot in modern living.

The impaired hearing person is not deaf. There is indeed a huge difference between partial communication and no communication. Similarly the visually impaired person is not blind. There is indeed a huge difference between partial sight and no sight.

How often does one see a person with a hearing aid and comment, "I didn't know that he was deaf". The same person who sees an individual wearing glasses for the first time wouldn't think of saying, "I didn't know he was blind". Have you ever been guilty of this error? It is simply unfair to place the deaf person in the same category with a person with impaired hearing. One communicates only with his eyes and the other uses both his eyes and his ear mechanism.

How often do our colleagues in medicine and even perhaps ourselves take a patient's history with an indistinct, rapid, mumbling voice with little facial expression or lip motion? How often are physicians guilty of dropping the volume of their voices at the end of a sentence and adding to the patient's problem by turning their face down towards their desk as they prepare to write the patient's

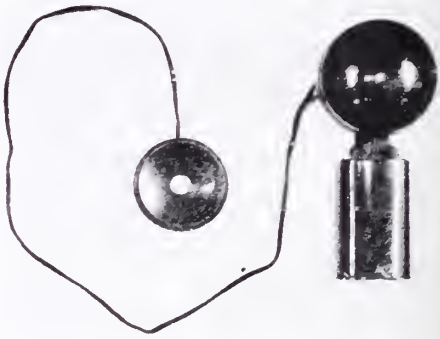

Fig. 4. First electric hearing aid by Alt. (1900)

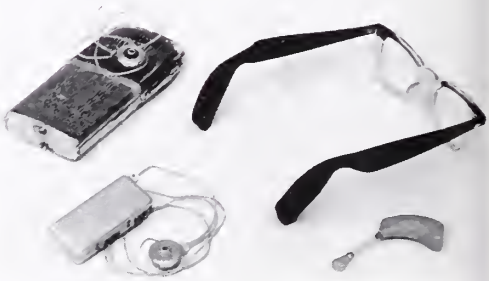

Fig. 5. Modern aids

answers? Perhaps the patient has even asked the doctor to repeat, has edged closer to his desk, may have even cupped his ear, or turned up a hearing aid only to be greeted again by a similar performance of poor speech patterns by the physician.

How often does a physician take a complete history and do a thorough physical examination on a hearing impaired person? How often does he prescribe and terminate his contact with this patient without even mentioning the patient's hearing problem? Perhaps this patient consulted the physician because of a tension or stress illness and never once was the real culprit of difficult communication considered as a basic underlying cause of this patient's illness.

When a newborn baby enters the world with a deformity of the external ears, the first thought of the family and the attending physician turns to the cosmetic rather than the functional problem at hand. Consequently, the plastic surgeon is often the first consultant to see such a newborn infant.

It is commonplace for the pediatrician to ask the young mother how her baby takes its formula, how it sleeps, how are its stools and never once inquire of the mother how does the child seem to hear.

In many medical schools throughout the country, students are given routine history and physical forms to follow in their examination of patients. In the history, inquiries are made regarding ear pain, itching and discharge from the ear, but usually neglect entirely asking the patient how the ear hears.

One would almost feel as we peruse this subject that the ears are made available to hold eyeglasses or earrings in position rather than to provide the vital function of hearing. It becomes your duty and mine, gentlemen, to broadcast far and wide this story that modern otology has to offer to the hearing handicapped and the deaf of this country and the world.

Indeed modern otology has developed rapidly since Doctor Coates encouraged and publicized the original work of Julius Lempert. Fortunately, today most patients with a conductive hearing impairment can be benefited by medical or surgical means. Unfortunately, however, there are still some cases of conductive impairment that cannot be benefited through surgery. Shortly before leaving Los Angeles, I operated on a beautiful little seven-year-old girl with a bilateral conductive hearing loss of some 60 decibels. Through the medium of a motion picture, I would like for you to join me as we open this little girl's left ear.

(Ear opened, explored and closed without benefiting the child's hearing due to a soft cochlear promontory, an overhanging exposed facial nerve and an abnormal vestibule.)

You can well imagine my inner feelings as I faced the young parents of this darling little girl. I had to tell them I was unable to correct their daughter's hearing problem. I immediately made it clear, however, that we have many operations today that we didn't have just five years ago—that a tremendous amount of research is continually being done through which we will better understand the delicate inner ear mechanism and thereby develop methods of helping the hearing of these individuals.

It behooves all of us here tonight to get on the ball and support otologic research to the very best of our ability. I am sure that the gentleman we honor here this evening would be the very first to second this plea. As President of the Centurion Club of the Deafness Research Foundation, I feel very strongly that each and everyone of you here this evening should certainly get on the ball and be a member of this support organization.

As otology continues to progress in the future, the patient with an inner ear loss will indeed have little to fear, for it is inevitable that the prophecy of Isaiah will be fulfilled and "The ears of the deaf will be unstopped".

Again I wish to thank you for your kind invitation to be with you this evening to pay tribute to George Morrison Coates through the medium of this second annual lectureship.

Environmental Carcinogenesis[1]

By Paul Kotin, M.D.[2]

ENVIRONMENTAL carcinogenesis is concerned with the identification of carcinogenic hazards, the elucidation of their mode of entry and mechanism of action in the host, and the characterization of populations affected by them. Variations in the occurrence of cancer in man have been identified in the past on the basis of either occupation, site of residence, socio-economic or cutural characteristics or special ethnic considerations. The agents responsible for the hazards have been investigated by laboratory procedures directed to pinpointing specific factors in complex environments responsible for the increased risk. The identification of the chemical structures of the agents is, of course, a prerequisite to studying their gross biological effect and anatomic and metabolic fate. Laboratory investigations of potential carcinogenic agents have followed carcinogenic suspicion on the basis of the chemical structure of certain compounds either naturally present or artificially introduced into the environment.

Carcinogenicity from a biological viewpoint is established by bioassay experiments in which the suspected agents are administered to test animals by feeding, subcutaneous or parenteral injection, skin painting or total body exposure in appropriately designed chambers. The disciplines applied in studying environmental carcinogenesis, therefore, consist of (1) epidemiology, with its allied science of biometry and statistics, (2) chemistry, both organic and synthetic, for the identification, purification and laboratory preparation of known and suspected carcinogenic agents, and biochemistry, aimed at elucidating the anatomic and metabolic fate of carcinogenic agents, (3) experimental pathology, concerned with evaluating the response of biological systems from single cells to intact hosts to carcinogenic stimuli, and (4) virology, aimed at identifying viruses with oncogenic potential and studying their infectivity and the immune response to these agents.

In the past, the various aspects of cancer research and the disciplines used in their implementation have been pursued in essentially a discrete and isolated manner. This has resulted in the accumulation of myriads of data which has not been paralleled, however, by a concomitant narrowing of the gap of extrapolation of experimental data to man. A need, therefore, exists for experimental design utilizing all of the tools of environmental carcinogenesis so that maximum extrapolation of data can be built in at the outset. It is to this concept that I wish to address the remainder of my presentation.

During the past 50 years, there have been two general approaches to the study of cancer: basic laboratory investigations and field research. While both have been concerned with the pathogenesis and natural history of cancer, each, until recently, has been largely regarded as a domain unto itself. By far the more extensive of the two in terms of research funds, workers and overall activity, has been that phase of laboratory work concerned with the study of the cell and subcellular fractions down to the molecule itself, directed to the question, "Why and how do cells become cancerized?" The reasons for this emphasis are obvious. First, understanding the mechanism of conversion of a non-neoplastic cell to a cancer cell offers the hope of information well beyond the limits of cancer itself. Second, this approach offers, at least on the superficial

[1] Harry Shay Memorial Lecture I, Temple University School of Medicine, 4 March 1964. This lecture is published concurrently with the Memoir of Dr. Shay by Dr. Stanley Lorber.

[2] Associate Director for Field Studies, National Cancer Institute, National Institutes of Health, Bethesda 14, Maryland.

level, potentially greater vistas and rewards in serendipity. Third, both pre- and post-doctoral training are heavily emphasized in these particular areas.

Field research, on the other hand, with its somewhat differently oriented approach, seeks to answer the question, "Why do people get cancer, and what is responsible for differences in susceptibility and resistance to cancer?" A marriage of these diverse approaches will have to be consummated before the answer sought by either can be attained. Certain steps can be taken to promote the courtship.

In studying cancer in people, one can regard the populace as his laboratory. It, in common with the experimental laboratory, has test animals of various characteristics, who are exposed to environmental or exogenous stimuli of contrasting types and intensity aimed at different target sites within the host. To establish the pattern of cancer in man in this human population laboratory cancer registries or morbidity surveys utilizing a total population as a base can be undertaken or, for a more limited approach, the retrospective and prospective studies using case control method can be used. This permits the identification of factors concerned with cancer causation and behavior in a manner analogous to the experimental laboratory with the limitation, of course, that (a) nature or society rather than the investigator designs the experiments, (b) the laboratory may be an occupational environment, a small piece of geography anywhere on the globe, or some cultural or sociological behavior traits (this frequently requires extensive travel), and (c) planned controls in the usual laboratory sense can rarely be established.

It is almost 200 years since occupational, i.e., environmental, cancer was established as an authentic entity. Since that time, the data from epidemiological studies have been used only to a limited extent by the laboratory worker in the design of experimental studies aimed at explaining variations in the occurrence of cancer. It is only in those rare situations where the fates have been generous in *obviously* identifying carcinogenic hazards that there has been any real laboratory progress; as for example, aromatic amines in bladder cancer; hydrocarbons (cigarette smoke, air pollution) in lung cancer; and radiation in malignant lymphomas and lung cancer. The significance of less overt carcinogenic influences in the environment are still essentially unknown and cancers of cryptic origin perhaps erroneously referred to as "spontaneous" constitute by far the great majority. Real probing, in the same sense and with the same energy, devoted to identifying complex and quantitatively small, though perhaps significant, variations in the biochemistry of the cell has not been accorded the characterization of analogous minor, though perhaps equally significant, differences in human populations at different risks to cancer.

To fill this void, there is a need for the integrated utilization of data obtained from epidemiological surveys, biometric studies and laboratory investigations to the end of increasing their use in the appraisal of carcinogenic hazards to man. Studies in experimental carcinogenesis from the nucleotide through the gene, up to the intact host, can be maximally benefitted by the characterization of similarities between the experimental animal and human at all stages of the investigation from inception to completion. A gap of equal concern has been the failure to utilize data on carcinogenesis originally obtained in the laboratory as a basis for designing field studies for the purpose of corroborating or identifying the actual significance of laboratory proven carcinogens in the causation of cancer in man. There is an urgent need for prospective epidemiological studies directed to this end.

It is well to recall, however, that the only real cancer control to date has resulted from activities in environmental cancer. Elimination of hazards incidental to occupational exposure to chromates, nickel, asbestos, petroleum products, aromatic amines, and the warning of the hazards of cigarette smoking as well as the concern over the use of synthetics with potential carcinogenic properties in con-

sumer goods are indeed methods of cancer control.

Prior to describing what I believe to be the future directions of experimental carcinogenesis, it is well to review the scope of the problems inherent in this area. A good starting place is a representative listing of the known chemical carcinogenic agents.

The site of action of a carcinogenic agent further complicates the study of environmental carcinogenesis. While carcinogenic agents may enter the host through any of the several anatomic portals of entry, resulting cancers can occur at distal as well as local sites. Cancers may develop at the site of initial tissue contact (skin PAH), site of elective deposition or localization (marrow, bone-benzol and radium), site of metabolism and detoxification (liver-azo dyes, chlorinated hydrocarbons, aminofluorenes), or site of excretion (urinary bladder-aromatic amines). The agents I have shown on the slides were established as carcinogenic by virtue of bioassay techniques which all, to a greater or lesser degree, fail to duplicate the circumstances of human exposure either quantitatively or environmentally. I would emphasize that of the various questions and factors critical to the interpretation of carcinogenic data, those relating to the problem of extrapolation are supreme. Further, we can conclude that it is apparent that (a) the sources of carcinogenic agents are ubiquitous and extend from natural products through synthetic agents introduced into the environment as a result of industrialization of society; (b) carcinogenic properties are not dependent on any unique chemical structure nor is there any evidence of tissue immunity, and (c) carcinogenic potency persists despite exposure to micro-quantities of carcinogenic agents.

The sensitivity of the biological systems we use to identify carcinogenic agents is increasing and with this have come some fundamental contributions which may serve to narrow the extrapolation gap. The exquisite sensitivity of the newborn to viral carcinogenesis has been duplicated with respect to chemical carcinogenesis. The trout liver is proving to be extremely sensitive as an organ for the identification of carcinogenic agents. From our knowledge of the metabolism of carcinogenic agents the liver is the primary site of metabolism of most of the agents I have listed. The enzymes involved in detoxification of certain carcinogens are found primarily in the liver. These are induced enzymes. In the newborn mammal and in the trout, the primary, almost exclusive function of the liver cell is the synthesis of protein to make more liver cells for the growing organ. This requirement for enzymatic activity is of such high priority and is so extensive that theoretically the ability to respond to the induction stimulus of carcinogenic agents is reduced if not obliterated. The result is persistence of the carcinogenic agents and, in essence, an increased exposure dose. Similarly, injury to the liver can interfere with enzyme formation and the result is increased tumor yield from a fixed dose of carcinogen. This experimental situation is compatible with certain observations in man.

Demographic studies have revealed a significant difference in the pattern of cancer incidence in certain groups who have migrated from one geographic site to another. This observation is several years old, and has been verified for neoplasms of several visceral sites. The role of the general environment in altering cancer risks is under active study. Differences in host factors, particularly on the enzymatic and immunological level may also partially explain the epidemiological differences described.

The possibility that differences in the enzyme profile might be responsible for the observed differences in cancer risk incidental to migration can be readily investigated in the laboratory where the movement of appropriate animal species from one controlled environment to another can be easily accomplished. In addition, the effect of age in relation to time of migration can also be studied. Finally, enzyme induction studies as well as detailed metabolic studies of carcinogenic agents in the various groups of animals comprising the study can identify any relationship between cancer incidence and fundamental biochemical

mechanisms. With this fundamental information complementary studies in man can be contemplated.

There is an increasing number of reports demonstrating a relationship between congenital abnormalities and increased risk to the development of certain forms of cancer in childhood. The association of mongolism with leukemia, and of Wilms' tumors with a variety of specific congenital defects are examples.

These observations provide a basis for the design of experiments to determine whether congenital defects and neoplasms are reflections of a single event, be it genetic or environmentally initiated during intrauterine life. The relationship of teratogenesis to carcinogenicity can in this way be explored and models hopefully developed to elucidate the mechanism of each.

"Why do people get cancer?" "Why do only certain of those exposed to an environment with increased risk get cancer?" and, finally, "Why should subtle changes in the environment be associated both with changes in cancer risks and changes in target sites for cancer development?" It is primarily from diligent scrutiny of the epidemiological characteristics of cancer in man that we can identify the signposts which will permit us to intelligently marshal the scientific disciplines available to us to answer the questions we have asked.

We are aware of the inherent limitation resulting from attempting to study in controlled experiments the activity of multiple factors in a heterogeneous host. In order to overcome partially these limitations, recent trends in carcinogenesis have been concerned with the techniques of exposure of animal to multiple carcinogenic agents from several environmental sources. This approach should be expanded. The three major classes of environmental carcinogens—chemical, physical and biological—can be studied effectively by duplicating, under laboratory conditions, as nearly as possible, the circumstances of human exposure. The feeding and parenteral administration of carcinogenic agents is time honored. Total body exposure in appropriately designed inhalation chambers is only now becoming more generally used. Chemical agents of known or suspected carcinogenic significance, including hydrocarbons, metals, natural products and macromolecular synthetics, can be aerosolized; animals can then be exposed to them in combination with known or suspected oncogenic and non-oncogenic viruses or in association with exposure to low-level radiation.

No discussion of environmental carcinogenesis can avoid reference to the possible role of viral agents in the causation of cancer in man. At the very outset, it is imperative to emphasize that should viruses be proven to be of etiologic significance to man, this would in no way negate or even minimize the significance of chemical and physical agents in carcinogenesis. Just as no one assumes the disappearance of a viral agent coincidental with the decreasing incidence of gastric cancer, certainly no one equates the increasing incidence of lung cancer with the appearance of a new viral agent coincidental with the period of rise. Rather, the possibility of chemical and physical environmental carcinogens having their effect mediated through either ambient viruses or *de novo* formed viral agents must be considered. The studies of the past several decades, which have identified carcinogenic agents, and more recent studies identifying oncogenic viruses provide a base for combination studies in the laboratory and epidemiologic studies in the field.

Protocol design should permit maximum possible quantitation of the relative contribution of each agent under experimental circumstances. The following are examples of the questions that may be asked:

(1) Do chemical agents mediate their carcinogenic effect through the action of viral agents?

(2) Can the premature aging effect of low level radiation be utilized as a model for determining the role of senescence in susceptibility to the action of carcinogenic agents?

(3) Do each of these agents possess a threshold for response and can this be modified by the simultaneous exposure to subthreshold amounts of several environmental stimuli?

From a chemical, physical and now biological viewpoint, a carcinogen-free environment is an impossibility. Industrialization and urbanization have created their own special contributions to the carcinogenic burden or load to which we are all exposed. Industry, in response to need and demand, is introducing into our environment an ever-expanding and increasingly complex spectrum of chemical agents which make life easier by increasing crop yield through fertilizers and pesticides, make food more universally available and attractive through preservatives and additives and consumer products more easily obtainable by a wonder world of synthetics and macromolecules. The rate of introduction of new agents into the environment is going to increase rather than decrease. When to this is added the potential carcinogenic burden incidental to radioactivity in the environment it is obvious that the most hopeful approach to cancer control is through an understanding of the total response of the host as well as the response of individual cells, so that protection, if possible, can be accomplished either by establishing limits to exposure or, indeed, developing host buffering or protective measures.

Transactions of the Sections

SECTION ON GENERAL MEDICINE

24 February 1964

PERNICIOUS ANEMIA AND POLYCYTHEMIA VERA: REPORT OF A CASE AND REVIEW OF THE LITERATURE. S. Z. Ahmed, M.D.,* and Edward H. McGehee, M.D. (Discusser: Allan J. Erslev, M.D.*) (*Abstract 1, below*)

STUDIES ON THE PRESERVATION OF BLOOD PLATELETS. Philip H. Geisler, M.D.,* Ioulios A. Iossifides, M.D.,* and Mary F. Eichmann, M.D.* (Discusser: Walter F. Ballinger, M.D.) (*Abstract 2, below*)

THROMBOCYTOPENIA SECONDARY TO INTRAVASCULAR THROMBOSIS. Farid I. Haurani, M.D.,* James R. Regan, M.D.,* Robert T. Carroll, M.D., and Allan J. Erslev, M.D.* (Discusser: Frank A. Oski, M.D.* (*Abstract 3, below*)

VISCOSITY AND THE RENAL MICROCIRCULATION. Allan J. Erslev, M.D.,* and Jean Atwater, M.D.* (Discusser: Laurence G. Wesson, Jr., M.D.*) (*Abstract 4, below*)

STUDIES ON THE TOXICITY OF THE FLUORINATED PYRIMIDINES. Panagis Kokolis, M.D.,* and Arthur J. Weiss, M.D.* (Discusser: Robert G. Ravdin, M.D.) (*Abstract 5, below*)

23 March 1964

PARTIAL OR COMPENSATED HYPOTHYROIDISM. George R. Fisher, III, M.D. (Discusser: Marvin Sachs, M.D.*) (*Abstract 6, below*)

THE MOBILIZATION OF NICKEL AND COPPER BY SODIUM DIETHYLDITHIOCARBAMATE. F. William Sunderman, M.D., Ph.D.,* and F. William Sunderman, Jr., M.D. (Discusser: George E. Farrar, Jr., M.D.) (*Abstract 7, below*)

ETIOCHOLANALONE AND PERIODIC FEVER. Bertram J. Channick, M.D., H. James Day, M.D., and Daniel K. O'Leary, Ph.D.* (Discusser: Hobart A. Reimann, M.D.) (*Abstract 8, below*)

EXPERIENCES WITH CLOMIPHENE IN THE TREATMENT OF ANOVULATION. Abraham E. Rakoff, M.D., and Alvin F. Goldfarb, M.D.* (Discusser: Laurence E. Lundy, M.D.*) (*Abstract 9, below*)

THE OBESE DIABETIC. Garfield G. Duncan, M.D. (Discusser: Charles T. Lee, M.D.) (*Abstract 10, below*)

27 April 1964

SURVIVAL FOLLOWING 54 DAYS OF OLIGURIC ACUTE RENAL FAILURE. Lee W. Henderson, M.D.,* Manuel Ramirez, M.D.,* and Lewis W. Bluemle, Jr., M.D.* (Discusser: George D. Webster, Jr., M.D.*) (*Abstract 11, below*)

INDOLES IN UREMIA: IDENTIFICATION BY COUNTERCURRENT DISTRIBUTION AND PAPER CHROMATOGRAPHY. J. Russell Elkinton, M.D., Dorothy Senesky,* George D. Ludwig, M.D.,* and Lewis W. Bluemle, Jr., M.D.* (Discusser: James E. Clark, M.D.) (*Abstract 12, below*)

RENAL SITE OF ACTION OF ETHACRYNIC ACID. Martin Goldberg, M.D.,* Donna K. McCurdy, M.D.,* Elwood L. Foltz, M.D.,* and Lewis W. Bluemle, Jr., M.D.* (Discusser: Laurence G. Wesson, Jr., M.D.*) (*Abstract 13, below*)

KIDNEY RETRANSPLANTATION FOLLOWING PRIMARY HOMOGRAFT FAILURE. Albert N. Brest, M.D*., and Robert Bower, M.D.* (Discusser: J. Russell Elkinton, M.D.) (*Abstract 14, below*)

SECTION ON MEDICAL HISTORY

21 April 1964

JOHN COAKLEY LETTSOM AND ENGLISH MEDICINE IN THE GEORGIAN PERIOD. Edward Rose, M.D. (Kate Hurd Mead Lecture cosponsored by the Section on Medical History, The College of Physicians

* By invitation.

of Philadelphia, and The Woman's Medical College of Pennsylvania)

SECTION ON OPHTHALMOLOGY[1]

19 March 1964

Carcinoid Syndrome with Orbital Metastasis. George D. Ludwig, M.D.,* and Milton Connell, M.D.*

Ocular Disorders Associated with Idiopathic Spontaneous Hypoglycemia. Daniel M. Albert, M.D.,* Robert A. Rubenstein, M.D.,* and Harold G. Scheie, M.D.

16 April 1964

Congenital Cataracts Associated with Congenital Ichthyosiform Erythroderma. Robert A. Rubenstein, M.D.*

Congenital Cataracts and Their Management. P. Robb McDonald, M.D.

SECTION ON OTOLARYNGOLOGY[2]

18 March 1964

Anesthetic Techniques and Management in Microsurgery of the Middle Ear. Seymour Schotz, M.D.* (Discusser: Richard J. Bellucci, M.D.*)

Neurilemmoma of the Cervical Region. F. Johnson Putney, M.D. (Discusser: John F. Daly, M.D.*)

SECTION ON PUBLIC HEALTH, PREVENTIVE AND INDUSTRIAL MEDICINE

3 March 1964

The Community and the Medical Center: Recent Developments in North Philadelphia. William A. Steiger, M.D., Francis H. Hoffman, M.D., Dorthea M. Lane, M.A.,* and David P. Willis, M.P.H.* (Joint Meeting with Pennsylvania Public Health Association, Region One)

[1] Abstracts of the presentations at this Section customarily appear in the *American Journal of Ophthalmology* and *A.M.A. Archives of Ophthalmology*.

[2] Abstracts of the presentations at this Section customarily appear in the *A.M.A. Archives of Otolaryngology*.

13 May 1964

Air Pollution Problems and Control Activities in Philadelphia. Walter E. Jackson, B.Ch.E., M.P.H.*

Air Pollution and Pulmonary Function Division. Philip Kimbel, M.D.* (Moderator: Katharine R. Boucot, M.D., M.P.H.: Joint Meeting with Pennsylvania Public Health Association, Region One)

ABSTRACTS

Abstract 1

Pernicious Anemia and Polycythemia Vera: Report of a Case and Review of the Literature. S. Z. Ahmed, M.D., and Edward H. McGehee, M.D. The Pennsylvania Hospital, Philadelphia, Pa.

Primary polycythemia developing in a patient on therapy for pernicious anemia is uncommon. The literature contains reports of twenty-one cases who have developed polycythemia one or three years after the diagnosis of pernicious anemia was established.

We here present an Italian man whose diagnosis of pernicious anemia with postero-lateral column involvement was made in 1946. He developed hepatosplenomegaly in 1956, and polycythemia vera in 1958, while receiving monthly injections of cyanocobalamin (30 mcg.). Blood volume and arterial oxygen studies were in keeping. Cessation of B_{12} therapy in 1960 eventuated in a fall in hemoglobin and a return of paresthesiae in the extremities by April, 1963. There was a prompt neurological and hematological response to cyanocobalamin therapy with the hemoglobin reaching 19.6 grams and hematocrit 57. A Schilling (radioactive cobalt-labelled B_{12} absorption and excretion) test was diagnostic of pernicious anemia.

A brief discussion of the possible contributing role of erythropoietin and of cobalt is given. It is our belief that the two diseases are coincidental.

Abstract 2

Studies on the Preservation of Blood Platelets. Philip H. Geisler, M.D., Ioulios

A. Iossifides, M.D., and Mary F. Eichmann, M.D. Cardeza Foundation, Jefferson Medical College, Philadelphia, Pa.

Interest in improving the treatment of hemorrhage associated with thrombocytopenia has led to experimentation with various techniques for the maintenance of function of stored platelets. The method to be reported consists in freezing human blood platelets in a suspending medium composed of 50% plasma in saline with 15% dimethylsulfoxide. Methods for the measurement of clot-retracting and lactic dehydrogenase activities have been used to study the preservation of these functions. The results indicate that freezing with 15% dimethylsulfoxide and 50% plasma effectively protects the ability of the platelet to retract a blood clot, and the activity of lactic dehydrogenase, one of the essential enzymes in platelet energy metabolism.

Abstract 3

THROMBOCYTOPENIA SECONDARY TO INTRAVASCULAR THROMBOSIS. Farid I. Haurani, M.D., James R. Regan, M.D., Robert T. Carroll, M.D., and Allan J. Erslev, M.D. Cardeza Foundation, Jefferson Medical College, Philadelphia, Pa.

The authors had the opportunity to study two patients with thrombocytopenia in whom the defect was not related to bone marrow depletion disorders, hypersplenism or drug reaction. The thrombocytopenia seems to be secondary to over-utilization of platelets as a result of intravascular thrombosis associated with hypercoagulable blood. The cause of the widespread thrombosis was not evident, however; it did not relate at least directly to atherosclerosis.

One patient was a 35 year-old white woman who presented the history and the physical findings of atrial myxoma. At surgery, and later at autopsy, a large thrombus was found, extending from the pelvic veins to the right atrium. The platelet count was depressed and remained at a low level for several weeks until a splenectomy was performed prior to surgery. The second patient, a 55 year-old white woman, was admitted to the hospital because of symptoms and signs of congestive heart failure. While this patient was in the hospital there was marked daily variation in her platelet count. Eventually she died and postmortem examination revealed multiple thrombi in coronary and pulmonary circulations and several infarctions in the left kidney and small intestine.

Although the differentiation of this syndrome from idiopathic or drug-induced thrombocytopenia is difficult, every attempt should be made to do so, since heparin would be the treatment of choice for the thrombocytopenia complicating intravascular thrombosis. There are few clues that may assist in the differentiation: Thrombocytopenia occurring in elderly (or even middle age) individuals associated with hypercoagulable blood, absence of bleeding tendency and negative serological tests for platelets should make one suspect this syndrome. Wide variation in the platelet count from day to day helps to support the diagnosis. In drug-induced thrombocytopenia, recovery is usually complete in a few days upon withdrawal of the offending agent and the remission is maintained as long as the drug is withheld. A rise in the platelet count following administration of heparin is further evidence in support of the diagnosis.

Abstract 4

VISCOSITY AND THE RENAL MICROCIRCULATION. Allan J. Erslev, M.D., and Jean Atwater, M.D. Cardeza Foundation, Jefferson Medical College, Philadelphia, Pa.

Since 1957, when it was established that erythropoietin is produced by the kidneys (1), the renal microcirculation has been of major interest to the hematologist. The production or release of erythropoietin in this organ appears to be inversely proportional to the tissue tension of oxygen and must consequently be dependent on the rate of flow of oxygen-containing blood in the renal vascular system.

The flow of blood through small vessels is

related to its viscosity and the viscosity in turn is related to the hematocrit. There is a characteristic and well-known relationship between viscosity and hematocrit, with a rapid rise in viscosity at hematocrits higher than 50%. However, the rise in viscosity is not as steep as it would be if the red cells were rigid particles (2). The normal fluidity of the red cell interior has been found to be of major importance for maintaining polycythemic blood in a fluid state and for permitting red cells to squeeze through narrow capillary channels. Despite the fact that the red cell is tightly packed with hemoglobin molecules, the intracellular fluidity is high and will readily permit changes in shape. However, if the content of hemoglobin is increased the red cell becomes rigid and will impart a significant increase in viscosity to whole blood (3). The intracellular hemoglobin concentration is high in hereditary spherocytosis and the whole blood viscosity is correspondingly high. Similarly, if the red cells shrink due to a hyperosmolar environment the hemoglobin concentration increases, the cells become rigid and the viscosity of whole blood rises.

This latter condition is of importance in the renal microcirculation in which blood in the medullary hairpin vessels is exposed to hyperosmolarity of up to 1200 mOsm. In order to measure the viscosity of blood exposed to such osmolarity, viscosity studies have been carried out in our laboratory. Two viscosimeters were used, an Ostwald capillary viscosimeter which operates at high and variable shear rates, and a Brookfield cone-plate viscosimeter which operates at a number of different but low and fixed shear rates. The following observations were made:

1. Viscosity of whole blood at initial hematocrits of 20% was not measurably influenced by changes in osmolarities despite increase in the intracellular hemoglobin concentration (MCHC) from 33% to 60%.

2. Viscosity of whole blood with an initial hematocrit of 45% increased moderately after exposure to hyperosmolarity. Since the hematocrit decreased materially in such environment, it appears that the lowering in hematocrit almost compensates for the increase in intracellular rigidity. That this was so could be observed in a study in which the hematocrit was readjusted to 45% after the exposure to high osmolarities. In this study the viscosity of the blood reached extremely high values, and the blood almost became a solid gel.

3. Viscosity of whole blood with an initial hematocrit of 60% increased steeply after exposure to hyperosmolar solutions, but this rise was also blunted by the concomitant fall in hematocrit.

These studies suggest a normal flow of blood at 20% hematocrit and a high extracellular osmolarity, a moderate decrease in flow at 45% hematocrit, and a more pronounced decrease at 60% hematocrit. Plasma skimming (4) leading to lower hematocrit of blood perfusing the medullary vessels may assist the flow of blood. It appears, however, that the flow of blood at even high hematocrits will not be materially impeded by a hyperosmolar environment.

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Abstract 5

Studies on the Toxicity of the Fluorinated Pyrimidines. Panagis Kokolis, M.D., and Arthur J. Weiss, M.D. Jefferson Medical College, Philadelphia, Pa.

Both Heidelberger and Burchenal noted that thymidine increased the toxicity of fluorinated pyrimidines *in vivo*, even though the compound neutralized the toxicity of 5-fluorodeoxyuridine in bacteria and tissue cultures. We found that all the pyrimidines,

with the exception of cytosine, increased the toxicity of the fluorinated pyrimidines in the mouse and rat. We have studied this phenomenon using C-14 labeled fluorouracil, giving mice a single dose of 25 mg/kg of fluorouracil either with or without 100 mg/kg of cold thymidine. Those animals receiving the thymidine showed a 50% depression in the excretion of radioactive CO_2; urinary excretion of C-14 labeled compounds was essentially unchanged. Studies of the acid soluble nucleotides in the liver and spleen showed that the simultaneous administration of nonlabeled thymidine markedly increased the concentration of C-14 labeled nucleotides. These were separated by column chromatography and increases were found in 5-fluorouridine, 5-fluorodeoxyuridine, and their respective phosphate derivatives. The incorporation of labeled fluorouracil into the RNA of liver was also found to be significantly increased by simultaneous administration of nonlabeled thymidine. An enzyme in liver, 3,5-dihydroxypyrimidine reductase, was found to be the only material capable of degrading 5-fluorouracil. This was purified by ammonium sulphate precipitation followed by chromatography through a calcium phosphate column. The purified enzyme was capable of degrading uracil, thymidine, and 5-fluorouracil and many unnatural 3,5-dihydroxypyrimidines, and any one compound competitively inhibited the degradation of any of the others. These findings suggest that thymidine increases the toxicity of 5-fluorouracil and 5-fluorodeoxyuridine by interfering with their degradation within the liver and that the increased production of a fraudulent RNA may be partially responsible for the increased toxicity of 5-fluorouracil when it is administered simultaneously with thymidine.

Abstract 6

PARTIAL OR COMPENSATED HYPOTHYROIDISM. George R. Fisher, III, M.D. The Pennsylvania Hospital, Philadelphia, Pa.

Through the mediation of the pituitary feed-back mechanism, the thyroid gland ordinarily responds to deficiencies of circulating thyroid hormone by enlarging itself. Two extrapolations are possible: first, that the diagnosis of incomplete hypothyroidism should not be made in the absence of a goiter, or factors (such as drugs, surgery, or Hashimoto's disease) which prevent goiter formation, and second, that the presence of a non-toxic goiter with euthyroidism implies that each unit of thyroid tissue is functioning at less than normal rate, since a normal rate of secretion by an enlarged gland would otherwise result in thyrotoxicosis. Since non-toxic goiters are almost invariably accompanied by normal thyroid hormone secretion, it seems valid to regard non-toxic goiters as a decompensated state of hypothyroidism, and *vice versa*.

The validity of the concept is attested by the infrequency, if not total absence, of a syndrome of spontaneous partial hypothyroidism without goiter. After thyroid administration is discontinued in goiterous patients, hypothyroidism commonly occurs for a transient period of time as the atrophic gland attempts to regain its former goiterous state; such a development is rarely seen after discontinuing thyroid in the patient who was entirely normal to begin with.

Abstract 7

THE MOBILIZATION OF NICKEL AND COPPER BY SODIUM DIETHYLDITHIOCARBAMATE. F. William Sunderman, M.D., Ph.D., and F. William Sunderman, Jr., M.D. Jefferson Medical College, Philadelphia, Pa.

Previous studies from our laboratory have demonstrated the effectiveness of sodium diethyldithiocarbamate ("dithiocarb") as a chelating agent for nickel in the treatment of acute exposure to nickel carbonyl. It has been found that dithiocarb is much less toxic than dimercaprol or penicillamine and more effective than either of these chelating agents in acute nickel carbonyl poisoning.

In the present paper are summarized the results of toxicity and metabolic balance studies before and after the administration of dithiocarb to experimental animals in relation to the mobilization of nickel and copper. In

addition, the results of clinical studies are given on the therapeutic use of dithiocarb in the treatment of familial hepatolenticular degeneration (Wilson's disease) and in patients suffering from hepatic porphyria.

Abstract 8

ETIOCHOLANALONE PERIODIC FEVER. Bertram J. Channick, M.D., H. James Day, M.D., and Daniel K. O'Leary, Ph.D. Department of Medicine and Fels Research Institute, Temple University School of Medicine, Philadelphia, Pa.

Bondy (1), in 1958, described two patients with periodic fever, muscle pain, headaches, epigastric pain and leukocytosis. During the febrile phase, chromatography of the urinary 17-ketosteroids revealed a disappearance of all peaks except etiocholanalone. In addition, unconjugated etiocholanalone was demonstrated in the plasma. It was postulated that a defect in hepatic conjugation occurs in these patients, allowing increased amounts of free etiocholanalone to accumulate in the serum and resulting in the clinical symptoms seen.

We have studied a patient who had the features of periodic fever and peritonitis with increased amounts of unconjugated etiocholanalone in the serum during the febrile phase. In addition, she appeared to have an autoerythrocyte sensitivity which seemed to precipitate the periodic attacks.

The patient, a 37 year old female of Irish-English extraction, had been having episodes of high fever accompanied by peritonitis, arthralgias and leukocytosis for two years. These episodes would occur shortly after the onset of her menstrual periods and continue until several days after the cessation of menstruation. Attacks could be prevented by suppression of menstruation with Enovid. Injection of 2 cc. of the patient's whole blood intramuscularly would induce an attack. Chromatography of urinary 17-ketosteroids during febrile episodes revealed primarily etiocholanalone. During afebrile intervals, urinary 17-ketosteroid fractions were present in a normal pattern. In addition, increased amounts of free etiocholanalone were demonstrated to be present in the serum during febrile episodes.

It is postulated that the autoerythrocyte sensitivity stimulated increased adrenal function which resulted in flooding of inadequate hepatic conjugating mechanisms for etiocholanalone.

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Abstract 9

EXPERIENCES WITH CLOMIPHENE IN THE TREATMENT OF ANOVULATION. Abraham E. Rakoff, M.D., and Alvin F. Goldfarb, M.D. Department of Obstetrics and Gynecology, Jefferson Medical College, Philadelphia, Pa.

Clomiphene, a triphenylethylene compound related to the estrogen chlorotrianisene (TACE), which paradoxically was first introduced as a possible antifertility agent, has now been found to be of value in the management of anovulatory infertility. In the rat this compound is anti-estrogenic, weakly uterotropic, inhibits endogenous gonadotropin release but does not antagonize exogenously administered gonadotropins; it has no androgenic or progestational properties. However, when administered to the normal female, although it may briefly delay ovulation, it appears to be luteotropic as evidenced by prolongation of the corpus luteum phase. In certain women with anovulation its administration, as shown by a number of investigators, is followed by ovulation, the precise mechanism of which is not known with certainty.

In the present study, Clomiphene was given orally to 153 anovulatory young women in a dosage of 50 to 150 mg. daily for 3 to 10 days. Ovulation resulted in 68 per cent of the cases, usually within 7 to 14 days of the onset of treatment. Pregnancy resulted in 35 cases, with conception occurring most frequently in the first or second cycle of treatment. The patients who showed a good estrogen effect on

their vaginal smear prior to starting treatment showed by far the best response, while those with atrophic smears rarely responded. The most serious associated effect was the occurrence of cystic enlargement of the ovaries in several cases, which regressed in several weeks. Vasomotor symptoms, particularly hot flashes, constituted most of the common side effects, occurring for several days during the course of treatment, most often in patients who responded with subsequent ovulation.

Abstract 10

THE OBESE DIABETIC. Garfield G. Duncan, M.D. Director, Medical Divisions of the Pennsylvania Hospital and the Benjamin Franklin Clinic, The Pennsylvania Hospital, Philadelphia, Pa.

In a study of more than 600 intractably obese patients, consideration is given to: a) abnormal glucose tolerance tests (standard and with cortisone added); b) clinical diabetes—newly and previously detected cases; c) management of refractory obesity in diabetic subjects with special reference to short intermittent periods of total fasting; d) outlook based on a three-year experience with intermittent total fasts as a preliminary measure in dealing with intractable obesity in diabetic subjects.

Abstract 11

SURVIVAL FOLLOWING 54 DAYS OF OLIGURIC ACUTE RENAL FAILURE. Lee W. Henderson, M.D., Manuel Ramirez, M.D., and Lewis W. Bleumle, Jr., M.D. Clinical Research Center, Hospital of the University of Pennsylvania, Philadelphia, Pa.

A 29 year old white male with traumatic acute tubular necrosis was maintained by a combination of extracorporeal and peritoneal hemodialysis for a sixty-seven day period, after which diuresis and recovery occurred. This case set a new record for oliguria with survival in acute tubular necrosis. Normal urine volume was maintained for the first 13 days following hospitalization. Urinary isotonicity with a rising blood urea nitrogen and creatinine indicated tubular damage. On day 14 following the administration of incompatible blood, the patient became oliguric. Five six-hour extracorporeal hemodialyses and twenty-two days of continuous peritoneal hemodialysis were required to maintain the patient. The traditional regimen for patients with oliguria was abandoned in favor of a dialysis program adjusted to permit the patient an *ad lib* fluid intake and normal diet during most of his course. Pseudomonas septicemia and staphylococcal and candida albicans peritonitis were successfully treated during the course of the oliguria. On two occasions the patient's urine volume rose to over 600 cc. per twenty-four hours, but on both occasions his clinical state necessitated dialysis, (day 21, day 43). Urine volume returned to and remained at oliguric levels following dialysis. The patient entered the diuretic phase only after the continuous peritoneal dialysis was stopped (day 65), calling into question the causal relationship between prophylactic dialysis and perpetuation of the oliguria.

Abstract 12

INDOLES IN UREMIA: IDENTIFICATION BY COUNTERCURRENT DISTRIBUTION AND PAPER CHROMATOGRAPHY. J. Russell Elkinton, M.D., Dorothy Senesky, George D. Ludwig, M.D., and Lewis W. Bluemle, Jr., M.D. Clinical Research Center, Hospital of the University of Pennsylvania, Philadelphia, Pa.

Preliminary observations in our laboratory indicated the presence of nonvolatile organic acids and indoles in the sera and dialysates of uremic patients. This report presents a detailed exploration of the indoles found in the sera of 3 severely uremic patients before and after dialysis and in the associated dialysates, as well as of the presence of certain indoles in the sera of a large series of such patients and in normal controls.

The sera and ether extracts of concentrated dialysate were processed by countercurrent fractionation between water and isobutanol and submitted to paper chromatography. The indoles so identified in serum and dialysate

were tryptophan, indoxyl-sulfate (indican), indoxyl-phosphate, and indoleacetic acid; in the dialysate alone, indoleacrylic and 5-hydroxy-indoleacetic acids and anthranilic acid (tryptophane metabolite); in serum only, 5-hydroxy-tryptophan, 5-hydroxy-indoleacetic-acid-sulfate, and 6-hydroxy-skatole.

In 71 uremic patients the mean serum indican level was elevated and showed a linear correlation with the serum creatinine concentration. In 14 of these patients, the serum concentration of indoleacetic acid was likewise increased.

Indoles may relate to uremic CNS symptomatology in that: 1) 5-hydroxy-tryptophan and 5-hydroxy-indoleacetic acid are intermediate and breakdown products of serotonin; 2) indoleacrylic acid may inhibit tryptophan pyrrolase and is a possible product of indolyl-acroyl-glycine—a peptide which is excreted in Hartnup disease (cerebellar ataxia) and in one family with mental retardation; 3) many psychotogens (e.g., LSD) contain the indole nucleus; 4) anthranilic acid is a conversion product in the metabolic pathway from tryptophan to nicotinic acid. Further studies are under way on the physiologic role of indoles in the uremic state.

Abstract 13

Renal Site of Action of Ethacrynic Acid. Martin Goldberg, M.D., Donna K. McCurdy, M.D., Elwood L. Foltz, M.D., and Lewis W. Bluemle, Jr., M.D. Chemical Section of the Department of Medicine, University of Pennsylvania School of Medicine, Philadelphia, Pa.

The effects of ethacrynic acid, a new orally active diuretic agent, on the renal mechanisms of dilution and concentration were studied. Twenty-seven acute experiments were performed on eighteen normal human subjects and two patients with diabetes insipidus. The experimental conditions included water diuresis and hydropenia with and without superimposed osmotic diuresis.

Ethacrynic acid caused primarily a natriuresis and chloruresis and had a distinct effect on both free water clearance (CH_2O) during maximal water diuresis and tubular reabsorption of solute-free water (T^cH_2O) during hydropenia. In maximally hydrated normal subjects and in patients with diabetes insipidus, CH_2O was significantly decreased as osmolar clearance increased, in contrast to mannitol diuresis. The drug also caused a moderate reduction in glomerular filtration rate and an increase in the excretion of potassium and hydrogen ions.

During hydropenia, T^cH_2O was markedly decreased at both low and high rates of solute excretion. Hypertonic mannitol or salineuresis, which in themselves increased T^cH_2O, when superimposed on a diuresis due to ethacrynic acid, could not raise T^cH_2O to normal levels. Characteristically, during the peak of diuresis caused by the drug, a virtually isotonic urine was excreted at various levels of solute clearance, and this effect persisted even after the peak of saluresis.

These results differentiate ethacrynic acid qualitatively from other diuretic agents and suggest that an important locus of action is in the ascending limb of the Loop of Henle where sodium chloride is reabsorbed in excess of water. This hypothesis would explain the effects of ethacrynic acid on both the renal diluting and concentrating mechanisms and also could account in large part for the type and magnitude of the solute diuresis following administration of the drug.

Abstract 14

Kidney Retransplantation Following Primary Homograft Failure. Albert N. Brest, M.D., and Robert Bower, M.D. Department of Medicine, Hahnemann Medical College and Hospital, Philadelphia, Pa.

A case report is presented of a 26 year old white male who underwent renal homotransplantation in July, 1963. A younger brother served as the kidney donor. Pretreatment with Imuran was given 5 days prior to surgery and continued thereafter. Although the immediate post-transplant response was satisfactory, signs of rejection occurred on the 23rd

post-transplant day. Despite local radiation, corticosteroids and Actinomycin, the transplant was irrevocably rejected within 4 days. The transplanted kidney was removed on the 35th post-transplant day. Subsequently, the patient—now renoprival—was maintained by intermittent dialysis. His condition improved sufficiently to consider retransplantation, which was later performed in October, 1963. The second donor was a maternal uncle. Suppressive therapy consisted of Imuran, corticosteroids plus local radiation. His subsequent course was complicated by staphylococcal bacteremia in the 3rd post-transplant month. The latter was controlled with Staphcillin. Six months post-transplant, his condition was satisfactory, with BUN of 35 mg.% and creatinine of 1.8 mg.%.

Memoir of Leandro Maués Tocantins, (1901–1963)*

By Robert T. Carroll, M.D.

DR. LEANDRO M. TOCANTINS was born at Para, Brazil, in 1901. He received much of his early education in Portugal and France. In 1919 he came to the United States and took his pre-medical studies at Cornell University from which he graduated in 1922. He entered Jefferson Medical College and graduated in the class of 1926. Under his picture in the yearbook appears the following statement: "Toc, the youngster from Brazil, the sober man, the circumspect gentleman. During his association with Jefferson he has made many good friends among us and is well liked by all. As a friend and entertainer he is excellent, his conversation is enlightening, he has a fine sense of humor and possesses the good manners of a well cultured man. He is much inclined to literature, has cultivated this hobby and assimilated a great deal. As a student at Jefferson, Toc has made good all around. We are sure he will make good as a physician and whatever else he undertakes." To those who knew him well, this seems singularly prophetic.

Following graduation he interned at Chestnut Hill Hospital and subsequent to this practiced for three years in Cleveland, Ohio. He then returned to Jefferson and became the J. Ewing Mears Research and Teaching Fellow, a position he maintained from 1930–1936. In 1936 he received a faculty appointment at Jefferson Medical College and Hospital. Over the years he advanced steadily through the academic ranks until, in 1954, he was named Director of the Cardeza Foundation for Hematologic Research. In 1959, the position of Cardeza Professor of Hematology was created to properly recognize his unique contributions and talents. During this time he was also a consultant physician at the Pennsylvania Hospital and head of the Hematology Department at that institution. In addition, he was a consultant in Hematology at the United States Naval Hospital in Philadelphia, a member of the editorial boards of *Blood*, the *Journal of Hematology*, and the *American Journal of Physiology*. In 1952 he became a member of the National Research Council Sub-Committee on Coagulation and in 1956 became a member of the Hematology Study Section of the National Institutes of Health. He participated actively in both groups until his death. He was vice-president of the International Society of Hematology (1952–1956), President of the National Blood Club (1956–1957), Member of the Société de Hematologie Française, the American Association for the Advancement of Science, American Society for Clinical Investigation, Society for Experimental Biology and Medicine, and finally, one of his most cherished, the College of Physicians of Philadelphia, which he served as secretary from 1949–1957. On October 12, 1960, the University of Brazil conferred an honorary degree on him at a special convocation in Rio de Janeiro.

He was active in planning and developing the Cardeza Foundation Laboratories for Hematologic Research which opened in November, 1960. When I first came to Jefferson in 1947 to work as a medical student with Doctor Tocantins, the Hematology Department occupied a single room in the hospital and two laboratories in the medical school which were actually infringing on the Department of Pharmacology. It was due to Dr. Tocantins' inspiration and guidance alone that the present Cardeza Foundation occupies a position of eminence throughout the city of Philadelphia, the country and the world.

* Read before The College of Physicians of Philadelphia, 1 April 1964. Prepared and published at the request of the Council of The College of Physicians of Philadelphia.

His passing removed from the ranks of hematology a physician who earned international respect not only for his scholastic analysis as shown by his many diverse publications, but also for his warm and sympathetic approach to his fellow man in the consideration of matters of mutual concern. He had the unique ability to state complicated problems in a clear fashion, often synthesizing new ideas in the process and creating a new insight for his listener. His gift for warm friendship in association with his colleagues was outstanding. He was a prodigious worker, a born leader, and an inspiring teacher, in the advancement of medical education and science at all levels and in all lands.

Doctor Tocantins was an ardent student of hemostasis and blood coagulation in all its aspects. He was deeply involved not only in the history of ideas but also in the persons who furnished the ideas. His scientific publications dealt with such diverse subjects as antiplatelet serum, urine antithromboplastin, bone marrow infusions, lipid anticoagulants, abnormal hemoglobins, and bone marrow transplantations. He was a special student of hemophilia and many of his publications of the last twenty years dealt with the inhibitor excess in this disease. His name has become synonymous with the hypothesis of inhibitor excess as the cause of the hemostatic defect in hemophilia. This concept has acquired many supporters throughout the world. One of his last publications deals with the extraction of teeth from hemophilics under hypnosis, without the use of transfusions or any hemostatic agents. At the time of his death he was in the process of editing the second edition of his well-known book, *Coagulation of Blood, Methods of Study*, the first edition of which is exhausted, and was conceived with the idea of helping young men and women unfamiliar with the many diverse and often imprecisely described methods of study get started in their work in the field of blood coagulation.

He was one of the first American workers in the field of blood platelets and in 1938 wrote an excellent monographic review on *Mammalian Blood Platelets in Health and Disease*. This is still widely used as a source of reference. In 1936 he reported on the production of thrombocytopenia in anemia by the addition of a heterologous antiplatelet serum. Many years later other workers connected this phenomenon with the autoimmune concept of idiopathic thrombocytopenia purpura.

He turned his interest toward the field of transplantation where his enthusiasm did much to create interest in the field of bone marrow transplantation. Many of the present workers in this field owe their interest to his enthusiasm. He managed and edited a section of *Clinical Reviews of Blood*. He enjoyed doing this task because he felt the review might be of service to his fellow hematologists. In addition, he edited the biennial *Progress in Hematology* which contributed comprehensive reviews on timely subjects in this field. The third edition of this book had just been completed prior to his death.

A tireless traveler, he attended and contributed to scientific meetings throughout the world. With the same unpretentious manner he would preside at a national or international meeting of hematologists or conduct the morning conference with his residents and fellows.

His welcome address to the first year class of Jefferson, in 1961, entitled "To Serve the Patient" was hailed by The New York Times as a classic statement for a warm human relation with the patient. He was indeed a unique individual with an outstanding talent as a clinician, teacher and investigator.

Those of us who were close to him knew that he was the victim of a constant and superhuman dedication to his work, plus a complete negligence of himself. He died, on the 22nd of March, 1963, at the conclusion of a business meeting at this College of Physicians. Dr. William Dameshek, the editor-in chief of *Blood*, writing on the death of Doctor Tocantins stated, "He was one of the greatest figures in American and world Hematology, withal friendly, sympathetic, warm and compassionate, a fine human being and friend."

Memoir of Harry Shay (1898–1963)*

By Stanley H. Lorber, M.D.

DR. HARRY SHAY died on the thirtieth of July, 1963, and with his passing our organization and our community lost a distinguished member, renowned investigator, prolific writer, frequent contributor to scientific sessions and valued friend.

Harry Shay was born on March 18, 1898 in Philadelphia and graduated from its Central High School. He attended college and studied medicine at the University of Pennsylvania, receiving his M.D. degree in 1921, and continued graduate work at its Graduate School of Medicine and in several universities in Europe. He was named Chief of the Gastro-Intestinal Clinic at the old Jewish Hospital in Philadelphia in 1928 and five years later became the Director of the Medical Research Laboratory of the Samuel S. Fels Fund, which in 1947 became the Fels Research Institute at Temple University School of Medicine. The many significant contributions to research made by Dr. Shay and his co-workers have made this institute pre-eminent.

The inquisitive and scientifically trained mind of this able clinician and investigator led him into a variety of fields of activity. Whenever he was initially not familiar with a particular problem, he explored it with such thoroughness and unbounded energy that he soon became its master. As early as 1933 he was the co-recipient of the Alvarenga Prize of the College of Physicians of Philadelphia for his work on the mechanism of gastric emptying. In 1937 he was the co-recipient of the first award of the International Congress of Radiology for his investigation of experimental irradiation of the thymus. His studies on the pathogenesis of peptic ulcer, gastric secretion, nutrition, diseases of the liver and pancreas made up a considerable part of his more than three hundred contributions to medical literature. His development of the pylorus-ligated rat as an investigative tool, now known as the "Shay Rat", and more recently the gastric fistula in the rat for the study of gastric secretion, are well known to investigators.

Approximately fifteen years ago, Dr. Shay started his studies on carcinogenesis. Work in this area led to the discovery of techniques for the induction of breast cancer and leukemia in the rat which resulted in the development of a screening procedure for anti-cancer agents.

In addition to his tremendous investigative contributions, Harry Shay was Professor of Clinical Medicine at Temple University School of Medicine and was the head of its Department of Gastroenterology. He was considered one of its outstanding clinicians and teachers; several of the men who studied under him now head departments of gastroenterology in this country and abroad. Dr. Shay also served as consultant to St. Christopher's, Frankford and Veterans Administration Hospitals and was a visiting lecturer at the Graduate School of Medicine of the University of Pennsylvania. He was a member of the American College of Physicians, American Gastroenterological Association, Sigma Xi, Alpha Omega Alpha, American Physiological Society, the American Association for the Study of Liver Diseases, an affiliate of the Royal Society of Medicine in England, fellow of the American Association for the Advancement of Science and of the American Federation for Clinical Research. He also held membership in the American Association for Cancer Research.

Dr. Shay's family roots were deep and a

* Prepared and published at the request of the Council of The College of Physicians of Philadelphia.

never-ending source of satisfaction and joy to him. He is survived by his beloved widow, Bertha, their two sons, Robert and Jonathan, and three grandchildren. To them we extend our condolences.

The members of this organization will miss Dr. Shay's frequent scientific contributions and stimulating inquiries as well as the more personal loss of a gentle, warm, and mature friend.

Memoir of Eliot Round Clark (1881–1963)*

By Roy G. Williams, M.D.

DR. ELIOT R. CLARK, Emeritus Professor of Anatomy, University of Pennsylvania, died at his home in Philadelphia, November 1, 1963 in his 82nd year. Dr. Clark came to the University in 1926 as Professor of Anatomy and Chairman of the Department, a position he occupied until retirement in 1946. Following retirement he was guest investigator at the Wistar Institute of Anatomy and Biology, although his activities were curtailed during the last eight years of his life by the heart ailment that caused his death. He is survived by his wife, by a daughter, Peggy Clark Kelly, and by a son, Douglas.

Dr. Clark was born in Shelburne, Massachusetts of a family long resident in New England. A New England boyhood of that day, especially in a clerical household, was likely to leave a stamp on the man and that it did on Dr. Clark in manifold ways.

Dr. Clark attended Yale University, graduating with honors in 1903. The following year he entered Johns Hopkins Medical School and there in the first course, the course in Anatomy, met the teacher who played such a large part in his professional development. Dr. Franklin P. Mall was one of the distinguished group assembled by President Gilman to serve as the first faculty of the new medical school of Johns Hopkins University. As director of the Department of Anatomy he brought to the position attractive qualities of mind and personality and also the new spirit of scientific inquiry then fostered by the German Universities where he had studied. This intellectual environment, new to American medicine, was ideally suited to Dr. Clark's temperament and inclinations and influenced him to devote his life to teaching and investigation in anatomical sciences. He completed his medical training with an outstanding record and received the M.D. degree in 1907. Dr. Mall then offered him an instructorship in Anatomy which he accepted and held for the following seven years. During this period he married Eleanor Linton, a trained biologist who was the daughter of Professor Edwin Linton of Washington and Jefferson College. Theirs was a scientific as well as a marital partnership. They worked as a team in the laboratory and published the results of their studies jointly. Their life together extended over more than fifty years. While at Hopkins they made several trips abroad for post-graduate study in German Universities and at the University of Cracow in the laboratory of Professor Hoyer. They were most appreciative of their experiences in Poland and were enthusiastic about the hospitable Polish people.

From Hopkins, Dr. Clark went to the University of Missouri, in 1914, as Professor of Anatomy and Chairman of the Department, remaining there in that capacity for seven years. In addition to his administrative and teaching duties he was a Contract Surgeon in the Army during World War I, a service that was particularly active during the great influenza epidemic.

In 1921 the family moved to Augusta, Georgia, where Dr. Clark had accepted the chairmanship of the Department of Anatomy at the University of Georgia. They lived there a bit short of the seven year period which they suspected might be a recurring cycle in their lives, when there was a call from the University of Pennsylvania. It was accepted with the knowledge that the new post carried unusual responsibilities. The department at Pennsylvania had been inactive for some years due to the serious illness of Dr. Piersol. The staff was much reduced, teaching responsibilities were very great, there was little time free for research, and a new building for Anatomy and Chemistry had to be planned and built. Dr.

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Clark proposed that the teaching of Anatomy in all its branches be confined to one semester thus allowing the staff half time free for research. This plan was introduced and is still in effect. It is significant that he regarded his first and most important duty to be to provide adequate time for himself and his staff to carry on original investigations.

Planning the new building was exacting and time consuming. With the precision and attention to detail with which he did all tasks, he laid out the floor plan, selected furnishings and equipment and when the building was completed in 1928 the anatomy floors were indeed a monument to his sole effort for he could not bring himself to delegate any of the responsibility he thought was his.

Dr. Clark's teaching philosophy and scientific thinking were deeply influenced by his association with Dr. Mall. As a teacher he thought that every student could do and should be required to do a *perfect* dissection. It made no difference to him whether or not dissection of the entire body was completed in the time available. The chief objective of anatomy teaching, as he saw it, was not to introduce the student to every known fact in anticipation of clinical needs but rather to inculcate habits of precise workmanship together with those of accurate observation and description and detailed recording and proper interpretation of data. The methods by which he attempted to attain those ends were not always appreciated by the student, but in after years a large number were grateful for the effort he made. He gave few lectures and none on descriptive morphology. Those he did give were devoted to new and more advanced aspects of the subject. He apparently had little sense of the passing of time. Lectures scheduled for one hour were generally extended to two and in the laboratory he would regularly spend an entire period talking to the four students at one table. This was sometimes felt to be a great trial by students who thought they were in a hurry, but, however impatient they may have been each man gave respectful attention.

Dr. Clark was curious about all biological phenomena and most sympathetic toward any attempts to explain them. He felt that traditional methods of fixation, sectioning and staining of cells and tissues for histological study could not provide the answers he sought except in a very limited way. Accordingly, he devised methods for microscopic study in living animals. He began his studies while at Hopkins using the transparent tails of frog larvae. These areas had been used for microscopic study for years, but not with the intensity they received from the Clarks. Hour after hour of continuous observations disclosed the appearance and behavior of cells in their natural habitat. Dr. Clark had speculated for years about the possibility of adapting a portion of the surface of mammal, even man, so that a region would be available for repeated and prolonged microscopic study in the living. He suggested the problem to one of his students and together they demonstrated that such a method was indeed feasible. In succeeding years Dr. Clark and others in his laboratory and elsewhere perfected the methods until they became standard for certain types of biological study.

With the new methods they developed the Clarks investigated a wide range of subjects among which were, the growth and behavior of blood and lymphatic vessels and the cells associated with them, peripheral nerves, fat, bone, cartilage, epidermis and connective tissue. Their observations and experiments were made with meticulous attention to accuracy and were reported with great detail.

Dr. Clark was active during all his professional life in the affairs of the American Association of Anatomists, serving as Secretary for twelve years. In the laboratory where he spent his long working day he was easily approachable and would generally interrupt whatever he was doing to talk freely with visitors if their business was serious. He did not practice camaraderie with anyone. Administrative duties, committee work or other bureaucratic affairs were things to be put off as long as possible since they interfered with research activities. During the academic year

his outside interests were chiefly current events and the theatre. He was devoted to the latter and at one time both he and Mrs. Clark participated extensively in amateur theatricals.

The family always spent the summer vacations at Woods Hole, Massachusetts, where their researches were continued at the Marine Biological Laboratory of which Dr. Clark was at one time a Trustee. There was also much time for tennis and sailing. Sailing was a special enthusiasm and a subject which when introduced in a conversation could be counted on to bring up recollections of close races.

These are some of the things that characterized Dr. Clark professionally; he was a man of integrity; he had well reasoned convictions about science and life in general and did not compromise with what he believed to be right; he had a deep sense of responsibility toward his profession and toward his teaching obligations; he had originality, imagination and great technical ability which he used to advance knowledge; he had intellectual curiosity and the preparation, patience, persistence and judgment necessary for effective teaching and research.

Lists of membership in scientific societies, honors and such are splendid tributes to a man's usefulness, yet somehow they seem to stand for less than the fact that his memory remains so bright and clear to his friends.

Memoir of Edward Hastings Campbell (1894–1963)*

By Karl M. Houser, M.D.

WITH the passing of Dr. Edward Hastings Campbell on December 27, 1963, after a short illness, the medical profession lost one of its most able aural surgeons.

He was born in Kane, Pennsylvania, on February 8, 1894, and received his early schooling in the public schools of Kane and Warren in Pennsylvania. His graduation from the University of Pennsylvania Medical School in 1919 was followed by internship in the Lankenau Hospital. He soon showed interest in Otolaryngology, and eventually became Chief of this specialty at The Children's Hospital, The Lankenau Hospital, St. Christopher's Hospital, the Pennsylvania and Graduate Hospitals. In 1940 he was appointed Professor of Otolaryngology in the University of Pennsylvania Graduate School of Medicine, as well as Professor in the Undergraduate School of the University of Pennsylvania at a later date. The status of Emeritus Professor was granted in July of 1959.

While a medical student he was married to Ethel Hanna, with whom he had attended High School in Warren, Pa. They were favored with three children and eight grandchildren, all of whom are today living and well.

During World War I he was in Medical School and was enrolled in the S.A.T.C. In World War II, he was a Captain in the U.S. Navy, and served with disinction for the duration of hostilities. He was Consultant Otolaryngologist to the Philadelphia Naval Hospital from that time until his death.

Dr. Campbell was a Diplomate of the American Board of Otolaryngology and was a member of every worth-while society dealing with his specialty. He was much more than an average Otolaryngologist. He possessed unusual manual dexterity, and was extremely able in performing the minute surgical maneuvers demanded in today's surgery of the temporal bone. To arrive at this perfection he spent many years working with Dr. Julius Lempert of New York City who was the individual responsible for reviving and improving upon operations on the hard-of-hearing, which had been attempted years before, but had been discarded as being technically too difficult and giving only temporary improvement. Dr. Campbell became so skillful in this delicate surgery that I feel it safe to say that he ranked with the best in the world.

In addition to these professional attainments he possessed many more facets about which you knew nothing until you knew him well. He loved music and was an accomplished pianist. Fishing, hunting, trapshooting and golfing were sports that he indulged in with the same intensity that prevailed in his professional work. All in all, he was an extremely well rounded, honest and reliable individual, full of fun, but able to be serious if need be. A man and physician of his attainments can not be replaced.

* Prepared and published at the request of the Council of The College of Physicians of Philadelphia.

Memoir of Mitchell Bernstein (1889–1964)*

By Sidney O. Krasnoff, M.D.

OF ALL who have benefited from this master clinician I am indeed the most fortunate—for the genes of his heritage have become part of mine as well, and for this I am forever grateful. Through his daughter, my dear wife, will be preserved some of the living kindness as well as the skills of this great physician. Never was his training so adequately reflected as during my examination for the American Board of Internal Medicine when Dr. Alexander Burgess asked me: "Young man, who taught you how to percuss?".

Who of us has ever forgotten those huge gentle hands placed over the precordium and, as the pleximeter approached the area of cardiac dullness, the flexion of the distal phalanx and a change in note as the plexor struck with the precision of the hammer on a piano string? The sounds reverberated throughout the ward as a cardiac silhouette was outlined with the accuracy of the fluoroscopic screen.

Born in Philadelphia, March 26, 1899, son of Henry and Rachel (née Grueman), his secondary schooling was completed at the old Central Manual Training High School. Early keen scientific interests were rewarded by a scholarship to the Philadelphia College of Pharmacy and Science where, in 1909, he completed the prescribed three-year course with one of the highest averages ever attained at that institution. A drive for more scientific knowledge and a basic desire to transfer this learning to his fellow man was financially thwarted a year—during which time he worked as Librarian at the Philadelphia College of Pharmacy and Science. Here the value of the written word, the textbook and the journal became an integral part of what was to become the "Compleat Physician".

In the year 1910 Mitchell Bernstein matriculated at the Jefferson Medical College, graduating with honors in 1914—followed by internship at the Philadelphia General Hospital.

To all of these institutions which contributed to his knowledge and development he remained a loyal servant—Philadelphia College of Pharmacy: Instructor in Materia Medica, Member of the Board of Trustees; Jefferson Medical College: Instructor in Medicine; Philadelphia General Hospital, Assistant Attending Physician.

He began the practice of medicine at Ninth & Tasker Streets, where it soon became evident that this yong man was to become truly a "professor"—a "Professor of Knowledge" to his students—a "Professor of diagnosis and therapy" to his colleagues—a "Professor of comfort" to his patients.

In June 1918 he married Bertha E. Buchsbaum and shortly thereafter moved his home and office to 1437 South Broad Street. He continued to study diligently with his "chiefs"—Drs. Thomas McCrae, E. J. G. Beardsley, and Solomon Solis-Cohen at Jefferson, and Frederick J. Kalteyer at Philadelphia General, and for many years served as an assistant to Dr. David Riesman. With such training the winner of the Obstetrical Prize on graduating Jefferson could only go on to great success in the field of Internal Medicine. After several years on the service of Dr. Bernard Kohn at the old Jewish Hospital, he was appointed Senior Attending Physician in Medicine in 1935. Two years later he became a charter Diplomate of the American Board of Internal Medicine. From 1920 to 1954 he maintained offices at 1321 Spruce Street. It was during these active years, until his retirement from practice in 1956, that his life was so full of giving. He had no active hobbies and played "hookie" from medicine for only one diversion—a good

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baseball game. The old Philadelphia Athletics were his only "vice".

Rounds at Jewish Hospital—"side of the bed rounds"—where the value of the history was stressed—where physical diagnosis and "laying on of hands" paramount—"if the laboratory findings don't agree with the history and physical findings, believe in yourself and not those lying numbers"—where "the right dose of the right drug at the right time does the right job"—and "when in doubt invoke the blessing of time", or, "that will do as much good as spittin' off the South Street Bridge" and many other aphorisms became keywords of the house staff.

When "Uncle Mitch" made rounds, everyone interested in what Dr. Thomas M. Durant now alludes to as "side of the bed medicine" showed up, regardless of whose service they might have been covering.

The affection of his patients was exceeded only by his affection for them. As one patient of many years put it, "I must die before Dr. Bernstein—if he should die first I couldn't live". His office records reflect this affection and trust, as well as medical acumen.

More than the respect of students and house staff, the affection of his patients, Dr. Mitchell Bernstein, Consultant, held the esteem of his fellow physicians. A bedside consultation was at the same time a boon to the patient, a lesson in diagnosis and therapy, and a testimonial to the attending physician, rendered with both sympathy and humor.

Until the ravages of Paralysis Agitans seized him, he was ever thus. Then with merciless vengeance, the metabolic effects of an early thyroidectomy (1936—Dr. George Crile, Sr.) began to take their toll. Stone formation (renal and gall bladder), diabetes, gout and finally Parkinson's Disease. This incapacitated him physically and, without the practice of medicine for Dr. Mitchell Bernstein, there seemed nothing but an empty, meaningless, unfilled void from 1958 until his peaceful end on March 24, 1964.

"When in doubt invoke the blessing of time"—but until then he will be missed by his wife Bertha, daughters Ruth B. Krasnoff, Naomi A. Diamond, a sister and five grandchildren—as well as the thousands of colleagues who stood at the bedside with "Uncle Mitch".

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The Temporal Lobe and Human Behavior[1]

By ROLAND P. MACKAY, M.D.[2]

PRESIDENT Gibbon, Fellows of The College of Physicians of Philadelphia, friends and guests: when your officers honored me with an invitation to present the S. Weir Mitchell Oration, I was astonished—for all great honors astonish—and deeply gratified to have your confidence in so high a degree. I pray you to accept my astonishment as homage to this illustrious College and to the pre-eminent medical tradition of this city, and my gratitude as a tribute to the great man who may justly be called the father of American neurology. This is not the occasion for recounting the great accomplishments and the broad human interests of Dr. S. Weir Mitchell, whose genius encompassed both neurology and psychiatry and embellished the literary history of this nation, both in poetry and in prose. Rather it is our privilege to do him honor by adopting his broad view of the whole spectrum of life and science, eschewing intellectual provincialism and narrow specialization. Weir Mitchell lived in a day when neurology and psychiatry were still siblings in the great family of medicine and had not yet "run away from home," the one to live in solitary contemplation of weird diseases, the other, first to abide in mad houses and later to dally with mysticism. He concerned himself not only with queer reflexes but also with queer behavior, and contributed greatly to our understanding of each.

Today, the two prodigal sons are returning home to medicine. Neurology no longer resides in an ivory tower. As a practical, clinical discipline, it no longer merely contemplates the exotic, but finds itself pertinent in a host of general medical diseases, e.g., to mention but a few, the innumerable circulatory disorders, the avitaminoses of almost all varieties, hepatic failure, renal failure, such metabolic disorders as diabetes, amyloidosis, the various lipidoses, the porphyrias, the disturbances of electrolyte balance—this sort of list could go on indefinitely. The neurologic features of nearly all these general medical disorders profoundly alter the deportment of the individual, both qualitatively and quantitatively. In fact, it may be said that general medicine has at last discovered neurology, so that scarcely a disease can be mentioned that has no neurological or behavioral aspect. But neurology is more than a clinical discipline; it is also a pure science of the nervous system, and as such it has so far explored the physiology of that system as to concern itself with the behavior of the total organism. By the technics of electrography, evoked responses to sensory

[1] S. Weir Mitchell Oration XVII, The College of Physicians of Philadelphia, 7 October 1964.

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stimulation in various modalities are picked up along their pathways through spinal cord, brain stem, thalamus and eventually from the cortex so that the sensory input can be traced to primary, secondary, even tertiary cortical centers; cortico-cortical connections can be outlined. By the technic of "physiological neuronography," introduced by Dusser de Barenne and used extensively by Percival Bailey, Warren McCulloch and many others, the discharges of groups of neurones sensitized by the application of strychnine have been picked up electrically at a distance and their projection pathways outlined. The epileptic discharges likewise, both spontaneous and evoked, can be followed from their sources as they spread throughout the brain, often to involve the whole brain, while stimulation of a cortical focus in the human epileptic patient has been observed to evoke conscious experiences with such strong feelings of familiarity as to suggest that a memory has been evoked. Similarly, electrical recording in the depths of the brain has helped to unravel the pathways of motor expression. Lesions of the brain, both experimental and clinical, produce such striking changes in behavior as "sham rage" (I have long wondered how the experimentalist can tell when the behavior of rage is a "sham"), obstinate progression, sensory imperception, aphasia, apraxia, loss of judgment and change in affect. Thus, neurology traces the warp and woof of personality and behavior.

In the same way, psychiatry, after over 50 years of a motivational psychology built out of dream interpretation, the construction of a new spiritual trinity of ego, superego and id, and an obsession with sex as the alpha and omega of life, and (something new in biology) the invention of the death instinct, just to even things up as between sex and death, has moved ever more surely toward the homeland of medicine. Perhaps the first harbinger of this return was the concept of psychosomatic medicine and its tacit admission that autonomic changes accompany mental and emotional states. The objective demonstration by Pavlov and others of the conditioned reflex was but the opening of the door to a new theory of learning based on biological principles destined to draw psychiatry again into the body of medicine. It is probable that the concept of conditioning may have a longer and deeper influence on psychology, psychiatry and on literature and the arts than has resulted from the concept of psychodynamics.

Thus there is need today for a reunion of neurology and psychiatry in understanding human behavior. In fact, psychiatry needs to discover, and is discovering, neurophysiology. Clearly no science of behavior can exist without reference to the brain as the organ of behavior, and the neurophysiologists, neurochemists and neuro-endocrinologists, not the mystics, hold the key. The latest answer to the ancient admonition to "know thyself" is this appeal to neurology—to neurophysiology—as the pure science of behavior and misbehavior.

To illustrate these principles I have chosen to sketch in a few moments some of the important functions of the temporal lobe and ancillary structures in human behavior. We shall omit from consideration the better known gnostic functions and their negatives such as agnosia, aphasia and apraxia as extending our field beyond the time available, and devote our attention particularly to those processes that determine the organism's total behavior as commonly conceived, in its qualitative and attitudinal aspects. In doing so, we shall see that, especially with the knowledge amassed in the past 20 years, the temporal lobe and the closely associated limbic system emerge as perhaps the most important of all areas of the brain in emotional and intellectual life. If Descartes' "seat of the soul" be not in the pineal body, it is perhaps, if anywhere, in these structures.

Isocortex: Sensory Staging Area

The temporal lobe, far from being a physiological unit, is rather a gross anatomical division of the brain, of diverse functions, some of which involve not only the temporal lobe proper but also neighboring insular, baso-frontal and baso-parietal cortices as well

as deeper and more widespread regions. In lower mammals (cat, dog) the temporal lobe is widely open to inspection, but with phylogenetic development it was progressively buried by frontal, parietal and temporal operculization until, in monkeys and man, it is largely hidden. Its superficial gross boundaries in man are the Sylvian fissure superiorly, the hippocampal fissure medially and inferiorly, and somewhat arbitrary lines to delimit it from the occipital and parietal lobes, drawn, first from the pre-occipital notch to the parieto-occipital fissure and, second, from the posterior end of the Sylvian fissure perpendicularly to the first line. The major part of the lateral and inferior surface of the temporal lobe is covered with neopallium, the so-called isocortex, of relatively recent phylogenetic origin, and, along with the neighboring isocortex of baso-frontal and baso-parietal as well as insular areas, having to do chiefly with sensory function, especially audition.

From the results of anatomical and neurophysiological experimentation as outlined above, and from observations on patients with disorders in the temporal lobe, the functions of the temporal isocortex have become apparent, revealing it to be a great sensory staging area where incoming information in all modalities is processed and interrelated, preparatory to functioning in the formation of behavior. Many authors might be quoted who contributed to our knowledge of these functions of the temporal isocortex as a sensory receptive and integrative staging area. Only relatively few of them can be cited here.

Auditory sensory projections pass from the medial geniculate body in man to a primary cortical center in the superior temporal convolution deep in the Sylvian fissure (Brodmann 41: Heschl's convolution). By stimulation of this area in the human epileptic patient Penfield (32) evoked hallucinations of sound. Most interesting are the findings of Tunturi (39) in the dog, who found a point-to-point cortical representation by frequencies —exactly as in the strings of a piano—and the involvement of an increasing number of

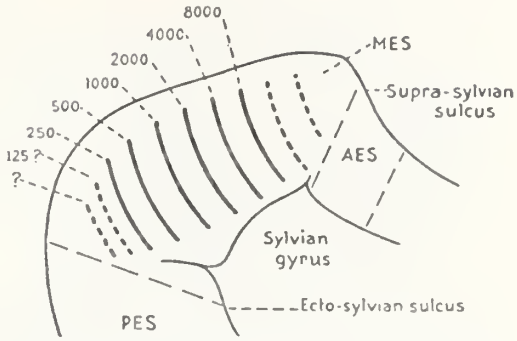

Fig. 1. Diagram of the bands of tonal localization in the primary auditory area of the right ectosylvian cortex of the dog. With increasing intensity of the stimulating sound at each frequency, neuronal responses are evoked over increasing extents in the respective bands. Symbols: AES, anterior ectosylvian; MES, middle ectosylvian; PES, posterior ectosylvian gyrus. After Tunturi (1950).

neurones at each frequency as the intensity of the stimulus increased. (Fig. 1) In lower animals and in the monkey there are secondary and tertiary auditory areas—probably involved in the categorization of sound qualities—but these have not yet been topographically identified in man. There can be little question that they exist and function in differentiating the vast elaboration of sound in meaningful speech and other auditory symbols, and their correlation with other modalities of communication—visual, tactual, gestural or mimetic.

While *visual sensory projections* pass to primary cortical centers in the occipital lobe and thence to secondary centers in the parietal lobe, these are immediately adjacent to the temporal isocortex, with which two-way cortico-cortical connections facilitate sensory integration between visual, auditory, and other sensory modalities.

Vestibular projections are not yet accurately known for man; in animals, experimental rotation evokes potentials in the region between auditory and visual cortical areas. Penfield (32) found that stimulation of the first temporal convolution in man elicited a sensation of movement in space.

A polysensory auditory, vestibular and

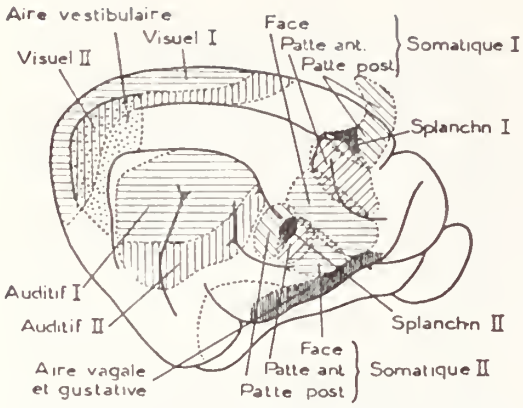

FIG. 2. Diagram summarizing the projection areas of various sensory modalities in the cat's cortex as revealed by the technic of evoked potential. Note that the vestibular area overlaps the secondary visual and closely approaches the primary auditory area. Olfactory area not shown. After Dell (1952).

somesthetic area has been found in animals in the anterior portion of the temporal lobe, apparently receiving impulses from thalamic relays and serving polysensory integration for posture and spatial orientation (26).

Olfactory projections, unique among all sensory modalities in that they do not utilize the great thalamic sensory gateway, reach a somewhat doubtful cortical area in the prepyriform baso-frontal area, finally reaching the periamygdalar nuclei (6, 7). While olfaction serves lower animals importantly in adjustment to the environment, it is, in the human subject, of less significance except in affective experience.

Vagal projections were found by Bailey and Bremer (4) to pass to the gyrus compositus of the cat, which they homologized with the baso-frontal area FG of von Economo, in the human. Such impulses arise from the respiratory tree, the upper gastro-intestinal tract and the cardiovascular system. Their function is not known, but they would seem to transmit visceral sensory information to this great temporal sensory staging area. Such visceral information is no doubt important in promoting food-seeking and nutrition.

Gustatory projections reach, not the temporal lobe proper, but the closely adjoining foot of the post-central gyrus in the area of lingua somesthesia, sufficiently close to be included in the staging area (7). (Fig. 2)

Allocortex and Limbic System

But even more important for our purposes than these sensory functions in the phylogenetically newer isocortex of the temporal lobe, is the older, allocortex of the hippocampal formation, amygdala, in the uncus, and pyriform area in the infero-medial portion of the temporal lobe. These structures constitute the core of the extensive limbic system which includes, in addition, the septum, the pre-optic space, the far-flung cingulate gyrus, almost encircling the corpus callosum, the fornix, mammillary body, mammillo-thalamic bundle, the anterior and midline thalamic nuclei, the habenula and parts of the basal ganglia. (Fig. 3) This complex is phylogenetically primitive and has changed but little with evolution except for the anatomical displacement incident to the vast enlargement of the neopallium as the cerebral hemisphere. Its functions, therefore, are presumably primitive, and, as we shall see, it mediates vegetative impulses to the autonomic system and dynamizes extrinsic behavior. As early as 1937 James W. Papez (28), basing his argument chiefly on anatomical facts, proposed a "mechanism of emotion" in which he hypothesized that the "central emotive process" is built up in the hippocampal formation, passes in the fornix to the mammillary body and thence *via* the mammillo-thalamic bundle to the anterior thalamic nuclei and on to the cingulate gyrus, a cortical center for emotion. Papez's concept has subsequently received striking confirmation in experimental and clinical observation on animals and on patients with disease of the brain or surgical destruction of portions of the limbic system. Some of these we may briefly—and all too sketchily—review.

We have noted the rich sensory inflow reaching the isocortex of the temporal lobe; thence it reaches the allocortex of the limbic system, as may be demonstrated by the

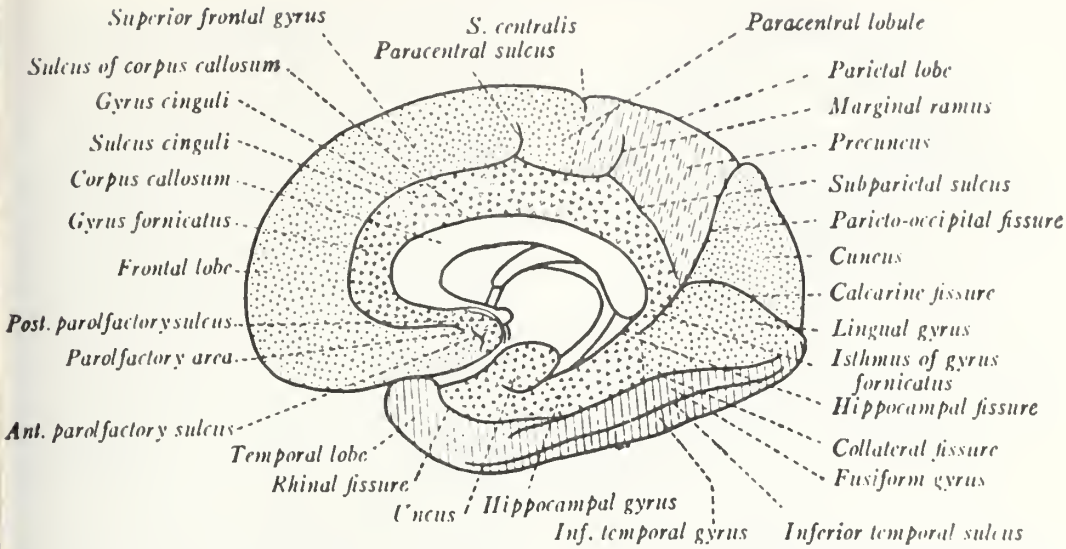

FIG. 3. Diagram of the medial aspect of the human cerebral hemisphere, showing parts of the widespread limbic system: hippocampal gyrus, uncus (containing the amygdala), fornix and mammillary body (not labeled). Others not shown are the pyriform lobe, pre-optic area, mammillo-thalamic bundle, habenula and anterior and midline thalamic nuclei. After Ranson.

evoked potentials which may be picked up electrographically upon sensory stimulation in any modality from any part of the body. For example, Paul D. MacLean (22) found that olfactory, gustatory and painful stimulation of the cat evoked rhythmic responses in the pyriform area, while auditory, visual and painful stimulation evoked responses in the hippocampal formation. In a later report, MacLean and co-workers (24) added that similar changes follow a shift of attention or alertness, and that pain was especially effective. Again, Green and Machne (14) recorded evoked potentials from the hippocampus of the rabbit upon visual, auditory and tactile stimulation. In their studies some hippocampal units responded only to certain modalities, and the response to tactile stimulation occurred or failed to occur according to the site stimulated. For example, touching the hind paw might evoke a response in some hippocampal units while touching the fore paw or vibrissae would not, suggesting a topographic map of the body in these units. Green and Adey (13) elaborated these findings in greater detail in a later publication. Rimbaud, Passouant and Cadilhac (33) observed evoked potentials with brief synchronization in the posterior portion of the hippocampus upon sensory stimulation, spontaneous arousal or electrical stimulation of the reticular formation in cats. Many other citations of the literature might be made; the above are representative. From such work it is evident that information already integrated in the temporal isocortex reaches the limbic system in auditory, gustatory, olfactory, vestibular, visual, somesthetic and probably all other modalities.

Going a step further, we may ask what the effects of limbic activity may be, once it is evoked by sensory stimulation of the animal. A great deal of experimental work is available to answer this question, involving in part electrical stimulation and in part surgical ablation of areas of the limbic system.

Stimulation. Electrical stimulation of certain areas of the limbic system in its anterior portion (anterior and subcallosal region of the cingulate gyrus, posterior part of the orbital gyrus, anterior part of the insula, the olfactory tubercle and pyriform lobe, the

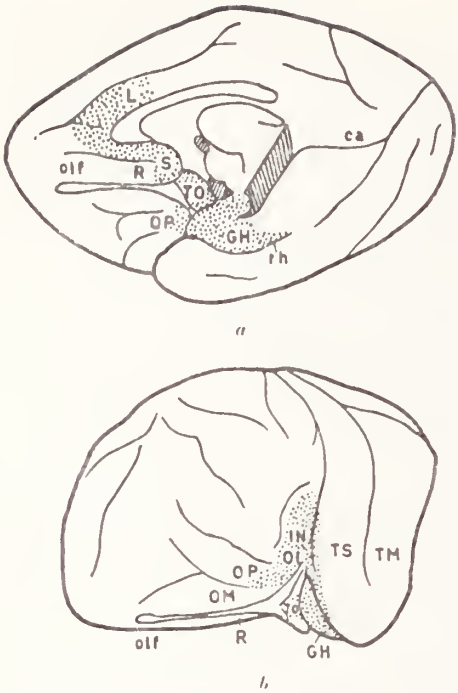

FIG. 4. Cortical centers of macaque brain which, when electrically stimulated within appropriate, specific parameters, produce (1) inhibition of sympathetic, and (2) excitation of parasympathetic visceral responses *via* anterior hypothalamic nuclei, and (3) adynamic behavioral responses. Symbols: Limbic gyrus: L, anterior; S, subcallosal. TO, olfactory tubercle. Orbital area: OL, lateral; OM, medial; OP, posterior. IN, insula. Temporal gyrus: TS, superior; TM, middle; GH, gyrus hippocampi. After Kaada (1951).

amygdala, the anterior portion of the hippocampal gyrus and the temporal pole) produces impressive vegetative and behavioral changes, dependent upon the exact location and the precise parameters of stimulation. MacLean (22) found that electrical stimulation of the rostral portion of the hippocampal formation profoundly affected autonomic regulation of respiration, cardiovascular and alimentary activities. As shown by Kaada (18) the use of low voltage and a rate of 40–60 c.p.s. in these rostral areas in the monkey leads to inhibition of certain sympathetic vegetative functions (respiration, circulation) and to excitation of parasympathetic activity (salivation, peristalsis, excretion, etc.), thus suggesting an over-all parasympathetic effect. These effects are produced by action of these anterior limbic centers upon the anterior part of the hypothalamus, *via* the middle forebrain bundle, the tuberculoseptal tract and the orbito-hypothalamic fibers. Hess (17) has shown similar parasympathetic effects of direct stimulation of the anterior part of the hypothalamus, which activates the medullary vagal nucleus *via* the reticular formation. (Fig. 4)

Furthermore, stimulation (within these parameters) of the above-mentioned anterior portion of the limbic system inhibits such extrinsic motor activity of the organism as spontaneous defensive action against attack and shivering in response to cortical or spinal stimulation. This inhibition, spoken of by Hess as *adynamic*, consists of passivity, with withdrawal, diminished muscular tone and loss of initiative and reactivity. Thus, the anterior limbic area, within certain parameters of experimental stimulation, exerts a visceral parasympathetic action promoting nutrition and inhibiting the expenditure of energy, sometimes spoken of as the feminine ("nurturing mother"), anabolic, or nutritive and energy-conserving function. It may be fairly presumed that these parameters of stimulation in the experimental animal correspond to the undisturbed state in the normal animal in his natural habitat.

It is striking that effects precisely the reverse of these are produced when slightly different locations in the anterior portion of the limbic system are stimulated at a somewhat faster rate (40–80 c.p.s.) (18). These reversed effects, constituting sympathicotonic vegetative responses (increased respiratory rate, blood pressure, pulse rate and diminished salivation and gastro-intestinal activity) and enhanced extrinsic motor activity (spontaneous, reactive, aggressive, mimetic or affective behavior) are, unlike the parasympathetic effects, more selective, inconstant and intermittent, at least in the cat and monkey. Such facilitatory or sympathicotonic effects are produced *via* the posterior and lateral segments of the hypothalamus, identified

by Hess as *ergotropic* or *dynamogenic*. (Fig. 5) They are obviously involved in the episodic, increased internal and external expenditure of energy under stress or in the face of emergency —hence in emotional excitement calling for defence or flight. They may be called masculine ("defending father"), catabolic and energy-dissipating mechanisms. Such selective, energy-dissipating reactions in the laboratory animal correspond, it is inferred, to the defensive or offensive responses to emergencies in the natural *milieu* of the normal animal ("alarm reaction" of Cannon and Selye).

But such stimulation of the limbic system in varying places and within varying parameters, besides setting the vegetative stage for varying types of behavior, leads equally to striking effects upon subjective experience in the human subject and upon the extrinsic behavior itself in the experimental animal. Gastaut has emphasized the intimate interrelations between the vegetative and behavioral patterns of the limbic system (10). Penfield and his group (31, 27) have performed many stimulations of conscious human epileptic subjects during their search for excisable epileptogenic foci, and have reported their patients' subjective experiences. They were able to confirm much of the electrophysiological work on temporal sensory areas which we have described, and noted, further, hallucinations with feelings of familiarity, "illusions" of fear and other emotions. Feindel and Penfield (9) produced behavioral automatisms in epileptic patients by electrical stimulation of the peri-amygdaloid area and hippocampal formation. The work of Penfield and his associates is fascinating and of supreme importance to our understanding of human experience and behavior. We shall consider this work again shortly.

Chapman (5) has reported that stimulation of the amygdala in epileptic patients reproduced some of the features of their spontaneous seizures including fright, sense of depersonalization (body getting smaller, etc.), visual and olfactory hallucinations, trance-like states, and various movements such as grimacing,

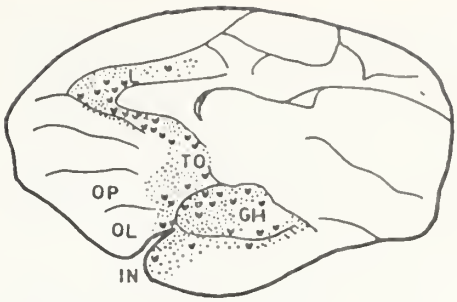

FIG. 5. Cortical centers of macaque brain which, when electrically stimulated within appropriate, specific parameters produce (1) excitation of sympathetic, and (2) inhibition of parasympathetic visceral responses *via* posterior hypothalamic nuclei, and (3) dynamic behavioral responses. Symbols: As for Figure 4. After Kaada (1951).

head turning and quasi-purposeful fumbling movements, as well as many autonomic responses, such as sweating, tachycardia, rise in blood pressure and pupillary dilatation.

In the experimental animal, Kaada et al. (19) found that stimulation of the amygdala in its phylogenetically older antero-lateral division produced contraversive head movements and clonic movements of the extremities as well as complex oral behavior such as sniffing, chewing, etc. On the other hand, stimulation of the phylogenetically newer basolateral divisions of the amygdala gave rise to searching movements (perhaps due to auditory or visual hallucinations) and to actions suggesting bewilderment, fear, anger or rage. These same results followed stimulation of the hippocampal gyrus and the cingulate gyrus. MacLean (22) found that stimulation of the rostral portion of the hippocampus in animals gave results suggesting that this area organizes such oral activity as eating, vocalizing and attack or defense for food. On the other hand, electrical stimulation of the posterior portion of the hippocampus changed purrs into howls and caused poor response to noxious stimulation, although after such stimulation aggressive behavior with spitting, hissing and the behavior of rage were noted. Stimulation of the posterior region of the hippocampus by cholinergic drugs produced in-

creases in grooming and evidences of pleasure. MacLean (23) has recently concluded that the anterior parts of the limbic system are largely concerned with feeding and self preservation, but that the septum and portions of the hippocampus and cingulate gyrus are involved in such feeling states as sociability and precopulatory activities.

Egger and Flynn (8) reported that, although stimulation of the amygdala produced no evident behavioral results, and stimulation of the hypothalamus caused tame cats to attack rats, the stimulation of both generally abolished the aggressive acts of hypothalamic stimulation. They concluded that the amygdala is a modulator or inhibiter of the hypothalamus, an emotional homeostat, as it were.

One may confess that the behavioral effects of electrical stimulation are not completely clear or sufficiently studied for us to draw more than a general conclusion that these structures profoundly effect emotional activity in certain specific ways. Our confusion is attributable to the complexity of the problem and the difficulty of inferring the meaning of the behavior of an animal under such abnormal circumstances as those of an electrophysiological laboratory. But the results of destruction of portions of the limbic system by disease or by surgical ablation are more definite.

Ablation. Experimental ablation of the anterior portions of the temporal lobes in monkeys as well as surgical ablation in patients, has revealed striking changes in the behavior of the subjects, indicating effects on emotional and intellectual life. The famous Klüver-Bucy monkeys (20), after bilateral excision of major parts of the temporal lobes, including the amygdala and much of the hippocampus, exhibited marked imperception with inability to distinguish between critically important objects—even between food and feces—except by smelling and tasting, and such tasting was re-performed every time the objects were presented. There were important changes also in the emotional reactions of the monkeys including loss of much of emotional behavior, loss of aggressiveness, and of maternal behavior, and exaggeration of sexuality and of "oral behavior," etc. Many other workers have performed ablations of one or both temporal lobes in animals; some have removed selected parts of the lobes, especially including the hippocampus. A few examples of the results may be mentioned. Paul MacLean (22) reported that removal of hippocampal areas tended to tame wild animals, to cause them not to avoid noxious stimuli, to behave sexually in a bizarre fashion and to require, like the Klüver-Bucy monkeys, to identify objects only by repeated oral examination. Percival Bailey (3) noted that in human subjects with psychomotor epilepsy, anterior temporal lobotomy, largely sparing the hippocampus, resulted in reduction of intensity of "reactive psychiatric" symptoms but left psychotic manifestations unchanged. Schulman (34) reported a patient with bilaterally symmetrical degeneration of the thalamus who exhibited profound intellectual deterioration. Similar reports had already been published by Stern (37) and by Grünthal (15). Schulman later (35) demonstrated that destructive experimental lesions of dorsomedial thalamic nuclei in the monkey destroyed previously learned delayed responses and, when performed in fresh animals, made the learning of delayed responses impossible. In 1958, Wyke (40) found that in 56 verified lesions of the temporal lobes, those in the anterior third caused confusion in over two-thirds, emotional lability up to homicidal violence in over one-half, and hallucinations, usually visual, in four times as many cases as did lesions of the middle and posterior third. Still, some changes in personality occurred in 40% of the mid-temporal cases and in 25% of the posterior temporal cases. Some form of aphasia was noted in nearly half the cases of lesions in the dominant temporal lobe, chiefly in its middle third.

Severe loss of recent memory has been observed by Scoville and Milner (36) in 10 human cases after bilateral radical removal of the anterior part of the temporal lobe including two-thirds of the hippocampus. The

impairment of memory was proportional to the extensiveness of the operation. Sweet and his associates (38) have reported similar loss of recent memory in a human case of surgical section of both fornices which, of course, represent a major portion of the efferent pathways from hippocampus to the mammillary bodies. We shall return later to discuss the role of affect in memory and the importance of the limbic system in this function

Temporal Epilepsy

The remarkable epilepsies arising from lesions in the temporal lobe are almost as fruitful a source of information on the role of that lobe in emotion and behavior as the experimental and clinical observations just outlined. Their fascinating complexity and variety of intellectual, emotional and behavioral phenomena, responsible for the clinical term, "psychomotor epilepsy," speak eloquently of the strategic importance of these lobes.

It is presently conceived that in all cases of epilepsy the epileptic discharge, in its basic electro-chemical characteristics, is unique and always the same, that it begins in a focus of disordered neurones for reasons quite unknown but probably patho-metabolic, and that it spreads (1) by contiguity (ephaptic), like a grass-fire on a prairie, to involve neighboring neuronal areas and (2) by synaptic connections to more distant regions. The various clinical "types" of fits derive from the variety of locations of the focus of origin and from the variable pathways, rates and degrees of the spread from the focus. This much was brilliantly inferred by Hughlings Jackson and confirmed by virtually all we have learned since. If the focus of origin be in a place where the discharge does not interrupt consciousness, the patient will experience an "aura" the nature of which will depend upon the source. With the spread of the discharge, the sequence of sensory and emotional experiences of the patient, as well as of the motor phenomena observed in his behavior, reflect the course of the spread. If the discharge spreads widely enough, consciousness may be abolished and a generalized convulsion occur.

In temporal epilepsy the first symptom may be a visceral, abdominal sensation, in others a strange affect, usually unpleasant, of fear (25), hunger, anger, weirdness, depersonalization or even humor, with laughter. A special one is the feeling of familiarity, to which the French applied the term *déjà vu*, or its opposite, a feeling of strangeness, *jamais vu*. In such cases one may surmize that the focus is in the limbic system, often in the hippocampal formation. Hallucinatory experiences occur in many cases and suggest a focus in the sensory cortices—olfactory ("uncinate"), gustatory, auditory (nondescript noises, voices, music, and sometimes a falsely perceived rhythm of the actual sounds of the patient's environment). Visual hallucinations, although rare, may occur, though the primary visual cortex in the occipital lobe only secondarily reaches the temporal lobe. Some attacks begin with brief episodes of aphasia, usually mixed or sensorimotor in type, in accord with the great role of the temporal isocortex in language. The motor phenomena of psychomotor epilepsy are, likewise, of great variety and degree, from a few smacking, chewing movements, to chaotic, sometimes seemingly purposeful but inappropriate activities such as idle wandering about, unbottoning clothes, humming a tune, shouting as if of rage, short sentences of anger, threat or rumination, as if spoken in a dream. In some cases, organized attacks of violence occur which, rarely, may cause damage or injure persons. Some such "automatisms" often seem appropriate to the obtunded consciousness and its disordered emotional content. In any patient, hallucinatory, affective, and motor phenomena may be combined in any degree, but the affective or emotional elements are almost always the striking features. Visceral reactions are often if not always present, such as tachycardia, hyperpnea, or diaphoresis. Consciousness is often not abolished in these states, though obtunded or distorted, and memory of them often preserved in some degree. In some cases the patients can later give a

detailed account of their subjective experiences, as if the whole process had been a closely observed dream. (Hughlings Jackson called these mental phenomena "dreamy states.") As a general rule, such psychomotor phenomena in any patient's seizures are repetitive and stereotyped, although some patients experience two or three varieties of attacks.

Various lesions, traumatic, encephalitic, vascular, neoplastic, may underlie such psychomotor epilepsy and they are usually found in the anterior portions of the temporal lobes: hence the term "temporal epilepsy." Clinical evidence of these lesions, other than the fits, often appears—homonymous field defects, aphasias, persistent (i.e., non ictal) auditory hallucinations, such as the constant hallucination of music, or visual hallucinations (e.g., "a little old lady on my left, dressed in brown" as described by one of my patients). Electrographic study between seizures may reveal negative spikes, isolated or in groups, as well as other patterns of abnormal discharge, and, if the lesion is large enough, a slow wave focus in the anterior temporal leads.

But most striking to the clinician is the almost stereotyped emotional instability of most psychomotor epileptic patients, separate from and between their attacks. One notes particularly a marked emotional lability with apparently unexplained swings of mood, explosions of rage or periods of depression. A marked unreliability is very frequent, with poor cooperation in taking medications, lying to cover up the disobedience, failure to follow any consistent behavioral pattern, as if the organization of character had been disrupted. Such patients are often difficult, contrary, "ornery"—and, as a psychiatrist might say, aggressively hostile, or, if tractible, deceptively so.

The phenomena of the psychomotor epileptic seizure are almost completely explicable by reference to the lesions in the temporal lobe and in its limbic components (11). The hallucinatory sensory features—visceral, somesthetic, auditory, visual, what-not—arise from discharging foci in the isocortex, the affective states from those in the hippocampal formation or other cortical limbic structures, the motor automatisms from discharges from these areas into motor mechanisms, the visceral responses from discharge of limbic foci into hypothalamus and the autonomic nervous system. But the same lesions in the limbic system that produce the bizarre episodic phenomena of the psychomotor fit are also responsible, by distorting affective and behavioral mechanisms, for the permanently disturbed personalities so often seen in these patients, apart from their seizures. Anti-convulsant medication often controls or diminishes the seizures but does not generally ameliorate the disorder of the personality. A drug which prevents seizures by raising the convulsive threshold or limiting the spread of the convulsive discharge does not, of course, restore the limbic system to its normal function in affective life. Temporal lobectomy, on the other hand, if it removes the lesion, relieves in considerable degree both seizures and the disturbance of behavior (2).

In brief, we have seen that the normal temporal lobe and its associated limbic system, supplied with internal and environmental information, discharges impulses on the one hand through the hypothalamus into the autonomic nervous system to effect appropriate visceral responses, and, on the other hand, into motor mechanisms to produce appropriate extrinsic behavior. The effects of both experimental and epileptic stimulation and ablation of critical areas of this temporo-limbic complex suggest that behavior receives here its selective color and direction, its dynamic drive and its visceral economy. If psychologic states are the mental correlates of neural processes,[3] then it is here that emotional attitudes are formed, conscious purposes defined and motivations activated toward their "goals." It is thus appropriate for us to consider this complex mechanism as the physiological basis of emotional life, as the

[3] As yet there are no neurologic terms for many psychologic states. Perhaps "neurodynamic" might serve as the neurologic equivalent for "affective" and "emotional," as being etymologically in accord with their meaning.

"home of affect." These, then, are the reasons why the temporo-limbic lobe is important in behavior. Just how important it is is startlingly evident upon careful consideration of the nature of "affect" and of its all-pervasive presence in mental activity.

The Nature of Affect

As a mental state, affect may be defined as the subjective attitude toward any perceived object or circumstance, or any proposed idea. Affective attitude runs the gamut of feeling from the extremities of passion to the subtlest nuances of preference and judgment. It includes not only the major emotions—love, anger, fear and every shade of desire—but also the subtlest degrees of appraisal: of appreciation or depreciation, of approval or disapproval, of acceptance or rejection. Affect is, then, the evaluation of any experience, of any idea, and it flows at once into behavior in accord with that evaluation. It is affect which colors all perception with infinitely complex shades of feeling, from awe before the Matterhorn to sweet pity for a child, which characterizes the polychrome of experience and determines the multifarious patterns of behavior. It is the stuff of which judgment is made, and on it depends the ultimate reaction that follows judgment.

Even more importantly—and this, I believe, is the crux of the matter, and the key to the thesis which I present to you—perception, which is the recognition of the nature of an object, must precede evaluation and reaction, and *for recognition to occur, an affective feeling of familiarity is essential.* Failure to recognize arises from the opposite feeling of unfamiliarity, or strangeness. As an example, consider one's encounter with another in the street. Recognition of him as one of mankind results from a feeling of familiarity with the species; recognition of his identity depends on a feeling of familiarity with him as a person. Only then does an additional affect appear, perhaps only of mild curiosity if he be a stranger, but widely divergent emotional attitudes (and behavior) if he be a well known friend or a familiar enemy. But the feeling-tone of familiarity is necessary also for the recognition and acceptance of mental images and of abstract ideas. The recognition of "truth" depends upon the feeling of agreement, of the emotional posture of "yes;" that of "error," upon the feeling of rejection, of the emotional posture of "no." Even the purest of "intellectual" propositions evokes either a warm feeling of acceptance (e.g., $2 \times 2 = 4$) or a cold one of rejection (e.g., $2 \times 2 = 5$). We distinguish the "true" from the "false" by the way we feel about them, as we have learned to feel about them in the school of experience. There can be no pure intellect, untinctured by at least enough affect to permit the distinction between true and false. Without affect, all things are equal, perceptions impossible, mental life and behavior in chaos.

Role of Affect in Memory and Learning

Likewise, memory, although an exceedingly complex function, requiring for its perfection a great number of factors, is completely dependent for its fruition upon recognition, which, as we have seen, is an affective feeling of familiarity. If a mind could retain and recall every impression, it would serve no mnemonic end if accustomed experiences felt strange, or new ones familiar, if there were no correspondence between the feeling of familiarity and items of previous experience. One would then "recognize" the new or disavow the familiar, without discrimination. This would be imperception indeed. Thus this polarity of feeling between familiarity and unfamiliarity is the touchstone by which we remember our acquaintances, our homes, the books we have read or the old songs heard, and consider strange, with an entirely different affect, whatever is new.

Considering these facts, we have an adequate explanation for the confusion, the imperceptions, of the Klüver-Bucy monkeys, whose limbic system on both sides had been critically damaged. They could no longer distinguish familiar objects from each other or from strange ones, even feces from food, without constant re-verification by oral investigation,

having lost, we may presume, the affect necessary to recognition and requiring now to call upon more ancient and alternative mechanisms. Likewise, their lack of aggressiveness, and their loss of much else of their emotional behavior, may be attributed to the destruction of their limbic centers and to the loss of affect and behavioral direction which these structures mediate. Their hypersexuality might be explained as a release phenomenon, attributable to total removal of the amygdala which, as we have seen, seems to be a modulator of hippocampal (emotional) drives, while the posterior parts of the hippocampus that are especially involved in social and sexual behavior, remain intact. The loss of recent memory resulting from anterior temporal lobotomy in the cases reported by Scoville and Milner, and from section of the fornices in Sweet's patient, is similarly explainable as due to the loss of the affective feelings of familiarity.

In the light of this crucial role of affect in intellectual processes, and of the function of the temporo-limbic system as "the home of affect," the problem of the "recording" of memory requires further consideration. Penfield's (32) observation that electrostimulation of localized discharging foci in an epileptic's temporal lobe may evoke visual and auditory hallucinations with a subjective feeling of familiarity led him to "locate" memory in that lobe.[4] But the matter can scarcely be so simple. In the first place, Penfield's stimulation of discharging epileptic foci may have done no more than disease often does in the epileptic, viz., evoke a complicated hallucinatory experience with the feeling of reminiscence called *déjà vu.* Many patients in this event report their seizures as evoking a "memory," as many clinicians can testify, though the recognition be false. There is, in fact, some doubt whether the stimulated "memories" of Penfield's patients represent anything specific that ever happened to the patient before. Thus, a stimulated hallucination with *déjà vu* is not necessarily a veritable memory. Further, so global a function as memory, which operates in all living creatures, from the lowest, without even a nervous system, to the highest, and which may be impaired by lesions in many other parts of the brain than the temporal lobe or the limbic system (e.g., agnosia, apraxia, etc.) can scarcely be "recorded" in the temporal lobe, to be replayed upon electrical stimulation. It appears unjustified therefore to conclude that memory is "located" in the temporal lobe, but merely that mechanisms essential to memory operate in that crucial area, and may be stimulated, artificially or by disease, into activity.

It remains to note that the limbic portion of the temporal lobe, so important in memory, is equally important in the acquirement of memories, i.e., in the processes of learning as suggested by the observations of Adey, Dunlop and Hendrix (1) and of Grastyán and associates (12). Some affective attitudes seem inherited, such as the approval of the nipple by the newborn, and the rejection of pain, and it must be assumed that the babe "recognizes" the nipple by an inborn "familiarity" with it. Inborn affective attitudes must rest on inborn mechanisms that are responsible for and contentment seeming happiness of the well-nourished, warm and comfortable child as well as for the distress and protest of even the newborn when deprived of support, exposed to loud low-pitched noises, or made to suffer pain. (Since destruction of the anterior parts of the limbic system abolishes recent but not ancient memories, these inborn and most ancient of all mechanisms of recognition and affect may be independent of the limbic system.) But for the most part, the affect of familiarity necessary to perception and recognition must be acquired through experience, and the specific affective attitudes toward all objects upon perception must likewise be es-

[4] Penfield (30) writes: "The major contribution of the temporal lobes to brain function apparently has to do with memory recording and with perception. It is evident that absence of the hippocampal gyrus and the hippocampus on both sides makes any permanent recording of present experience impossible. This may mean that the ganglionic record of the stream of consciousness is located there, or it may mean that the hippocampal structures play an essential role in the laying down of the record elsewhere."

tablished in the hippocampus and related limbic structures as a result of experience.

Now the learning process, for so long the subject of debate among psychologists, would seem to rest upon the physiological process of conditioning. Without considering here the nature of this process, it is evident that it must involve the full participation of the temporo-limbic system, with its assembly and correlation of complex sensory data and the investment of such data with a precise neurodynamic (emotional) drive for both visceral and extrinsic response. But since conditioning has been demonstrated to occur at many levels in the nervous system—even at as low a level as the cochlear nucleus (16), I would emphasize, not that all processes of learning occur *only* in the limbic system, but that the limbic system is *essential and indispensable* to those processes at higher levels. The evidence for such a statement is quite clear, as we have seen in the results of ablation or damage in animals and man. Destructive lesions of the anterior portions of the temporal lobes and limbic system not only impair perception and memory, as in the monkeys of Klüver and Bucy, but greatly impair the relearning of lost perceptive distinctions and the re-establishment of forgotten memories. Schulman's thalamotomized monkeys, already mentioned, demonstrate the impairment of learning ability by a destruction of an important link in the limbic system—the dorsomedial thalamic nuclei. The impairment of these neurologic structures by injury or disease, at birth or later, clearly reduces the capacity for learning—the educability—of the individual.

Neurosis as "Conditioned Misbehavior"

The crucial role played by educability—by the learning process—in human behavior needs no emphasis. It is clear that behavior is disturbed in myriad ways by disease. But it is equally clear that it is often disturbed in the normal child, quite in the absence of disease, by miseducation, by unfortunate circumstances and by baleful influences in early youth that mould his character to futility and to neurosis. With the exception, perhaps, of "conflict neuroses" that arise from insoluble dilemmas in affectively ambiguous circumstances, we may legitimately consider that the neuroses represent "conditioned misbehavior," without need for the mystical fol-de-rol of psychoanalytic dreamers (21). We cannot tarry here to elaborate this concept of the neuroses which are the most frequent of all behavioral disorders. But such deformed patterns of extrinsic behavior, and of emotional and visceral reaction, must, it would seem, be dynamized even in the theoretically normal temporo-limbic system as they were laid down there by the conditioning of experience.

But if the limbic system be structurally damaged by trauma or disease, at birth or later, how much greater must be the deformities of behavior, of emotional life and of personality that result! We have noted how lesions in the temporal lobe lead to such severe behavioral disorders in the psychomotor epileptic patient resulting from the disruption of his affective mechanisms. No doubt in some instances this type of organic damage produces the same behavioral disorders even if inadequate to produce psychomotor seizures. Should we not then, at least theoretically, entertain the possibility of such lesions in the limbic system as a basis for the "psychopathic personality," the recidivist criminal, the kleptomaniac or the compulsive-obsessional invalid, all so resistant to psychotherapy?

We may venture even further. One may wonder what the limbic system has to do with that remarkable psychiatric disorder, the manic-depressive psychosis, with its unexplained cyclic alternations, its impervious barriers against persuasion and psychotherapy but its astonishing response—at least in the depressive phase—to electro-convulsive shock, applied over the temporal poles, that produces amnesia while relieving the despondency? Equally legitimate, it would seem, is the concept, already suggested by Passouant and Cadilhac (29), that the profound disorders of emotional life so characteristic of schizophrenia may be attributable to organic disorders—structurally, chemical or hormonal—in that

"home of affect," the temporolimbic system. If this be speculation, it is at least not naked speculation, but speculation based upon a great body of neurologic fact, hard-earned in laboratory, surgical amphitheatre, and clinical observation.

And so, ladies and gentlemen, and honored physicians of this historic college, it appears that neurology, both clinical discipline and pure science, indeed resides in no ivory tower, but leads us toward an understanding, mayhap to something of a solution, of mankind's most ancient problem, the riddle of human behavior. I am sure that Weir Mitchell would rejoice with us at so happy a prospect.

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The Development of Specialty Medical Clinics at the Hospital of the University of Pennsylvania[1]

By T. GRIER MILLER, M.D.[2]

IN 1913 I attended a dinner given in honor of Dr. Frederick H. Klaer on his tenth anniversary as chief of our hospital's medical dispensary. Dr. Alfred Stengel on that occasion outlined a plan for increased out-patient services, this including a salaried staff, nurses, clerical and technical personnel, adequate physical equipment and even social service. Although at the time he was thinking primarily about the relief of strain on the wards and better service to the community, he also discussed better teaching facilities and investigative projects. In that same year the Finance and Grounds Committee of the University's Board of Trustees and representatives of the hospital's Board, at a meeting in the Provost's office, approved a general scheme of structural development for the hospital, this including a medical clinic building. This was in line with an earlier plan conceived by Dr. John S. Billings when he was the hospital's director. Indeed, as far back as 1894 the building for the Pepper Laboratory of Clinical Medicine had been constructed, the first separate building for such a purpose in the United States. Then in 1910 the John Herr Musser Department of Research Medicine had been created, the first University department for full-time medical researchers in our country. Thus already before the Klaer dinner some clinical research was underway in our hospital and medical school. It was not until a half century ago, however, that with us the importance of an intimate relationship of such research with patients was fully realized.

Dr. Stengel himself was especially active in furthering plans and seeking funds for a clinic building. He secured the consent of the Pepper heirs for the tearing down of the William Pepper Laboratory building and soon an architectural firm was asked to draw plans for a new building to replace it. The first substantial response to a campaign for funds, however, did not come until 1925. At that time the late Mr. Martin Maloney agreed to contribute $250,000 on the conditions of an additional half million being obtained and the building being completed within three years. Finally and with the help of unrestricted gifts to the University, another $100,000 from Mr. Maloney and $200,000 from the Eldridge Johnson Foundation, the latter for an extra floor, the building was completed in 1929. Incidentally, the Johnson Foundation deserves mention because its objective also was medical research. It had been established following a suggestion by Dr. Thomas B. Holloway, professor of ophthalmology, regarding the need for a study of the physical sciences in relation to medicine.

Even before the completion of the Maloney building several special sections, then called clinics, had been established within the department of medicine. The first one was in 1915 and it was for a study of health hazards in industry. This grew out of a controversy in the State Legislature regarding the employment of juvenile girls in the cigar industry. I was made chief of this clinic and Dr. H. F. Smyth, its hygienist. Our original studies involved an extensive clinical investigation of cigar workers, their techniques and hygienic surroundings. This led to an investigation of the dust hazard in various types of industry, especially textile and cement plants. Although, because of the outbreak of war, this clinic had to be abandoned and has not been reopened, it already

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had led to an important cooperative study with Dr. H. R. M. Landis and Dr. Henry K. Pancoast and a publication by us on silicosis versus tuberculosis.

The first section or clinic for the concentrated study of a special group of patients was organized in 1919, immediately after the war. It was a *Cardio-Vascular Clinic*, this particular field of medicine being chosen because of the extensive observations of cardiac lesions in the military service, the development and help of electrocardiography in their diagnosis and the accomplishments in this field by various investigators in certain English hospitals. Dr. Charles C. Wolferth was put in charge of this clinic. Its outstanding and extensive accomplishments, which I cannot here detail, have resulted largely from his initiative, imagination, dedicated service and inspiring leadership.

In the beginning no financial support was available, but soon Dr. Wolferth was able to demonstrate the value of such a group study of hospitalized and dispensary patients. By 1928, when the Maloney Clinic building was nearing completion, the Robinette Foundation, resulting from a gift of $500,000 by Mr. Edward B. Robinette, was established for the promotion of research along cardio-vascular lines. Also at that time, a liaison was established with the Philadelphia General Hospital, where, under the supervision of Dr. Thomas M. McMillan and Dr. Samuel Bellet, more patients were available for special studies. Thus with adequate quarters in the new building, the financial support of the Robinette Foundation and a larger staff, it was possible greatly to increase both the clinical and the investigational activities of this clinic.

The varying problems involved in this branch of medicine soon became so obvious that it seemed desirable to subdivide this clinic's activities. In 1934, Dr. Eugene M. Landis, who had joined the staff in 1931, and whose publication with Dr. John H. Gibbon, Jr., on a method of producing vasodilatation in the lower extremities had attracted considerable attention, supervised the inauguration of a subsection on peripheral vascular disturbances. Dr. Lewis H. Hitzrot, previously with the Gastrointestinal Section, was put in charge, and upon his retirement, in 1936, Dr. Hugh Montgomery became its chief. Another subsection, one on Hypertension, with Dr. William A. Jeffers as supervisor, was begun at about the same time. Upon his retirement in 1961 this subsection was reabsorbed by the parent clinic, then called Cardiac Section. A third subsection on kidney disturbances will be mentioned later.

Upon Dr. Wolferth's retirement in 1952, Dr. Calvin F. Kay became Chief of the Cardiac Section, and, in 1961, Director of the Robinette Foundation. Meanwhile, another gift, made by the Penn Mutual Life Insurance Co., provided additional housing facilities for this Section. With this expansion and the general growth of the hospital, an increasing demand for cardiac studies, especially in connection with cardiac surgery, and the acquisition of more full-time staff members, the activities of this section increased enormously. At present there are 12 permanent staff members, 5 fellows, 18 technicians and clerks. Fifteen thousand diagnostic electrocardiograms are made annually. Many problems in cardiology have been solved in this section and many of its procedures now are accepted as routine by the medical profession.

Meantime, in 1936, what had previously been a vascular subsection became an independent *Vascular Section*. Except during the war, when it was managed single-handedly by Dr. Meyer Naide, it has been continuously under the supervision of Dr. Montgomery. It has steadily grown in importance, has made through its 218 publications many significant contributions to the literature and now has on its staff 6 physicians, 2 surgeons, 2 chiropodists, 3 secretaries and one technician.

The second permanent clinic to be established was that for *Gastrointestinal* diseases. Already in 1913, as the first Henrietta Heckscher Fellow in Medical Research and as a member of Dr. Richard M. Pearce's Department of Research Medicine, I had begun to do gastric analyses and indeed had attempted intestinal intubation. Consequently Dr. Stengel asked me to organize this clinic. Without

funds, adequate quarters or any laboratory equipment, but with the help of an associate, Dr. Katherine Andrews, and a competent technical and clerical volunteer, this section was inaugurated in 1926. From the beginning we were aided by the facilities of the Pepper Laboratory, then under the direction of Dr. Herbert Fox, and of the Radiological Department, headed by Dr. Henry K. Pancoast. By the time we were settled in the new building we also had secured from friends and patients some donations for research activities. Among the physicians who joined us in 1930 were Dr. Francis D. W. Lukens, Dr. William Osler Abbott and Dr. Katherine O'S. Elsom.

Before joining our staff, Dr. Abbott had been an associate in pharmacology. Following up his interest in research he undertook with us, by intubation, a study of the motor functions of the duodenum. This soon led to our development of the Miller-Abbott tube for intestinal intubation, a project which had interested me for some years. As a result of accomplishments with this technique by Dr. Abbott and other associates, including some cooperation with surgeons, radiologists and physiologists, we received in 1935 three national awards. This also led to further financial assistance: endowments by Miss Frances T. Kinsey and by Mr. and Mrs. Justice M. Thompson; outright gifts by Mr. William H. Donner and many friends and pharmaceutical firms. With this help we were able during the next two years to accept various applications for fellowships. Among the fellows accepted, in addition to some of our own graduates, were men from Harvard, Dartmouth, the University of Maryland, England, Puerto Rico and China. Many of these physicians, while with us, made significant contributions to our routine clinical and research activities and since have distinguished themselves in teaching and research. The practical value of our new technique, as an aid in the management of patients with intestinal obstruction, however, goes primarily to one of our surgeons, Dr. Charles G. Johnston.

Another early project of our Gastrointestinal Clinic, initiated by Dr. Elsom, concerned nutritional disturbances, especially vitamin deficiencies. For a time this was carried out with the help of the Pepper Laboratory, but eventually it led to a donation of $30,000 by Mrs. Marian Gordon Thompson. With this support and the cooperation of the Philadelphia General Hospital we were able to establish in 1940 in that institution a so-called "Vitamin Research Project". This was supervised by Dr. Elsom with Dr. Thomas E. Machella and Dr. Joseph T. L. Nicholson as associates. Unfortunately, due to another war, this project had to be given up in May of 1942.

An additional subsection of our Clinic arose as the result of our experience early in the war period with a single patient who, after receiving a mumps serum prophylactic injection, developed an homologous serum hepatitis. The resultant studies by Dr. John R. Neefe, of our staff, and others soon led to federal support for an extensive hepatitis investigation. This was carried out in cooperation with the Department of Pediatrics and resulted in a number of important contributions to the literature.

A final activity of credit to our Clinic was the establishment of a subsection of psychiatry. Realizing the need for such help in the management of many patients and knowing of the reluctance of the hospital to accept such a department, we were able, with the help of Drs. Edward A. Strecker and Kenneth E. Appel, at least to establish such a subsection. It was operated under Dr. Appel's supervision and conducted by his associates, Drs. Herbert S. Gaskill, Donald T. Dodge and William L. Peltz. This functional service was so helpful to us and to the hospital as a whole that, in 1949, it was recognized by the hospital as a formal department.

Following my retirement in 1948, Dr. Machella was chief of this clinic until his death in 1961. His contributions and those of his staff were numerous, especially important being his physiologic explanation of the dumping syndrome. Dr. Frank P. Brooks has succeeded him and is supervising important physiological studies of intestinal secretions. Endoscopic studies and liver and bowel biopsies

are among other activities of this section. Among the members of Dr. Brooks' staff are exceptionally able workers in both the clinical and experimental fields. About 2000 patient visits are made annually and the number of publications since the origin of this section is 337.

An *Allergy Clinic* also was organized soon after the war. Dr. Richard A. Kern was its chief until in 1946 he left us to become the professor of medicine at Temple University. Meantime, during the war, Dr. Malcolm W. Miller was in charge and he eventually succeeded Dr. Kern. Then in 1954, Dr. Eugene A. Hildreth became its director. This section has made most outstanding contributions to medical knowledge, including especially the therapeutic value of housedust hyposensitization, the allergic etiology of mucosal nasal polyps and the interrelation of bronchial infection and bacterial allergy. From the beginning attention was given to the training of physicians in specialties where allergy might be involved: internal medicine, otolaryngology, dermatology and pediatrics. Present interest is largely in mechanisms of delayed hypersensitivity, homotransplantation reactions and resistance to infection; also in environmental factors other than allergens in the pathogenesis of asthma.

Now let us again refer back to the year 1926. At that time, at the suggestion of Dr. Charles H. Frazier, and as part of the plan outlined by Dr. Stengel, a *Thyroid Clinic* was established. At first it was under the supervision of the departments of medicine, surgery and radiology; but later, of medicine only. In 1936 it was expanded into an *Endocrine Section.* For 38 years, from its origin to the present, this clinic has been supervised by Dr. Edward Rose. Though conducted primarily for the treatment of patients with endocrine disturbances, Dr. Rose, in addition, has made many outstanding contributions to medicine and has given excellent training to many residents and fellows.

A *Diabetes Clinic* was organized in 1927 by Dr. Russell Richardson. Upon his retirement in 1947, Dr. W. Wallace Dyer took over and, after 1956, Dr. G. Clayton Kyle. Dr. Lukens, originally with our clinic and who subsequently became the director of the George S. Cox Medical Research Institute, has cooperated regularly with this section and supervised its research activities. Its special studies have concerned immunity and exercise in diabetes, the newer forms of insulin, tuberculosis in diabetes, glucose tolerance tests and the management of diabetes in pregnancy. This section was the first in this area to send children to such camps as that now sponsored by the Philadelphia Diabetic Association.

A *Chest Clinic* was started in 1929 as a consultation service under the direction of Dr. Isadore Kaufman and a year later it was taken over by Dr. Simon S. Leopold. (Drs. Henry Hopkins, Louis Lieberman and Leon H. Collins were early associates.) Its early activities consisted largely in giving pneumothorax to patients with active tuberculosis. In 1957, Dr. Robert L. Mayock became the director, took over from the department of anesthesiology a subsection on pulmonary physiology and created a school of inhalation therapy. In addition to its care of patients, its consultation service and its supervision of pulmonary function studies, this section has made contributions to our knowledge of sarcoidosis, cor pulmonale, and the metabolic aspects of pulmonary disease.

Another clinic, that of *Hematology,* was created in 1930, soon after the completion of the new building. Dr. Thomas Fitz-Hugh, Jr. was its director until 1947, when Dr. Adolph J. Creskoff, already an associate, assumed that responsibility. Upon his death in 1961, Dr. John W. Frost, also previously an associate and still heading the clinic's clinical functions, took over temporarily that function. Then, in 1962, Dr. William J. Williams, having a special interest in research, became the director. This section, which now includes 10 physicians, 6 technicians and 2 secretaries, handles about 1800 patient visits annually and 500 hospital consultations. It has trained many hematologists now in charge of similar clinics in other institutions and has conducted special investi-

gations of chemotherapeutic agents, of mechanisms in megaloblastic anemias, and of blood coagulation.

An *Arthritis Section* was not organized until 1937. Dr. Bernard T. Comroe was its first chief. Since his death in 1946, Dr. Joseph Lee Hollander has been in charge. Today this is recognized as one of the leading such organizations in the country. Its research activities have included a study of the effects of climate on arthritis by means of a controlled climate chamber. Also it has made pioneer studies on the use of steroids, on the definitive diagnosis of gout, and on the pathogenesis of rheumatoid arthritis as an auto-immune disease.

A *Renal Section*, now under the administration of Dr. J. Kapp Clark, originated in the 1930's as a subsection of the cardio-vascular clinic and as a result of Dr. Landis' work on renal extracts. Dr. Kay was in charge from 1939 to 1942, when the section had to be abandoned because of the war. It was not reestablished until 1947, and then as an independent section with Dr. Clark as supervisor. It is financially supported by the National Research Council and the C. Mahlon Kline Fund for Research. Its work involves primarily the application at the human level of basic physiologic concepts initiated in pharmacology by Dr. Carl F. Schmidt.

A *Neoplastic Section* was established in 1948. For a time it functioned with the hematology section, with Dr. Ralph Jones, Jr., in charge. Since the establishment of the C. W. Robinson Foundation for Hematology, however, it has functioned separately and under the supervision of the departments of surgery and of medicine. Its present chiefs are Dr. Sylvan H. Eisman and Dr. Robert G. Ravdin. Its principal accomplishments have been the development of cytotoxin as a chemotherapeutic agent and a study of adjuvant chemotherapy with surgery.

A *Chemical Section* also was organized in 1948. Its objective is the study and care of renal failure. It differs from the other sections cited in that its entire staff is on a full-time basis. Dr. J. Russell Elkinton, who also is editor of the *Annals of Internal Medicine*, is its chief. Dr. Lewis W. Bluemle, Jr., of this staff, is in addition the director of a so-called Clinical Research Center, the latter being separately organized and under the supervision of an advisory committee, this including the dean of the medical school and members of departments of medicine, surgery and anesthesiology.

I have not been able in this brief report to submit data on all our medical sections or even superficially to cover the accomplishments of those mentioned. Neither can I present a summary statement for the total group. Perhaps the fact that 21,205 patient-visits were made last year gives some idea as to the services rendered directly to patients. On the other hand, from the point of view of research accomplishments, to state that the annual budget for research has been in excess of a half million dollars is no more helpful than to state the number of researchers, their total hours of work or the number of their publications.

This brief review of the origin of and some of the accomplishments of our medical sections suggests that they are largely responsible for the investigational activities of our department of medicine. The wards, as always, have continued to meet the primary teaching needs and to afford to patients maximal professional care. It is in them that the practical results of research are coordinated and applied for the benefit of patients and the instruction of students. For progress in each particular field of knowledge, however, highly trained personnel, elaborate equipment and selected groups of patients are required. This latter objective we have found to be most satisfactorily attained through special sections, each dealing with problems and patients in its particular area and all coordinated through the chief of the department of medicine.

The Community and the Medical Center: Recent Developments in North Philadelphia[1]

By WILLIAM A. STEIGER, M.D.[2]

IT has been said that voluntary hospitals (such as Temple) get the interesting patients, whereas public hospitals (such as Philadelphia General Hospital) get the sick ones. This statement points up the high degree of selectivity of patients by hospitals and their staffs. Even though they are called Community Hospitals and receive community and public fiscal support, neither in their construction, programs, organization or philosophy are they often based on a study of or consideration of the community's needs.

This selectivity of patients in voluntary hospitals is more readily supported in University hospitals, for the claim is made (and with some validity) that excessive service demands would inundate the staff and diminish their teaching and research efforts. At the same time, the hospital administrator is most anxious to have all of his beds full all the time; the cardiac surgeon competes for all of the surgery he can find; the kidney specialist wants more of the interesting renal cases, etc. While these efforts sometimes push the frontiers of knowledge forward—and this should be a primary university goal—again the selectivity is based on the physicians' interest and not necessarily on the community's needs.

Now several things have happened that are propelling universities to reconsider their traditional role as scholarly isolates and to undertake community involvement. One of these factors is the "Urban Sprawl"—the increasing "slumminess" of the areas surrounding some metropolitan universities, such as the University of Chicago, Temple University, and Cornell Medical Center in New York City. It has become increasingly difficult for such universities to overlook the growing social problem areas which surround them. In addition, their Out-Patient Departments and Accident Dispensaries are being swamped by poverty-stricken, budget-defeating patients.

Another reason for university interest in the community is the recent availability of government money to close what has been called the *Science-Service Gap.* When our Out-Patient Department and wards lose $900,000 per year treating the medically-indigent, perhaps we should expect the community through their City, State and Federal grants to support our efforts. And, reciprocally, perhaps the community should expect to have a strong voice in our endeavors. If the principal health problems of our time are chronic illness, problems of aging, mental illness, and perinatal mortality (in the latter category we stand 11th in the world) shouldn't the community expect our participation and leadership in mutual efforts to resolve these community burdens?

Where *does* the community look these days for relief of its medical burdens? It looks increasingly to its hospitals—not to the American Medical Association or the County Medical Society or the College of Physicians (as important as these institutions are to the profession, they are remote in the eyes of the people).

The hospital is today's center of medical activities. Medical care is no longer centered in the home, or in the physician's isolated office. Its center is the hospital. The building of physician's offices on the grounds of Lankenau and

[1] Read before the Section on Public Health, Preventive and Industrial Medicine, The College of Physicians of Philadelphia, 3 March 1964.

[2] John A. Kolmer Professor of Community Medicine, Temple University School of Medicine, Philadelphia, Pennsylvania 19140.

Abington hospitals is explicit recognition of this fact. Today, the hospital *is* the *Center for Community Medical Care*—in spite of the frequent reluctance of hospitals and their staffs to assume this new role and in spite of the facts that their physical facilities, programs and organizations are often poorly designed for this role.

Where is the *Center for Community Health?* I don't know that we have one. In the context of the writings of Dr. John B. Grant (whom I regard as a great public health philosopher), a Center for Community Health would house facilities and personnel to maintain health; to prevent diseases due to communicable, environmental or other causes; to institute measures for early diagnosis and preventive treatment of illness; and to rehabilitate individuals disabled by accident or disease to social usefulness in the community.

With these views and thoughts in mind the Philadelphia Department of Health whose leaders, Dr. Norman R. Ingraham, Commissioner of Health, and Dr. John J. Hanlon, Director of Community Health Services, have for years advocated a working relationship between Philadelphia's five medical schools and ten District Health Centers. Temple University Medical Center (face to face with surrounding social and health problems and now the recipient of a U. S. Public Health Service planning grant) and the Health Department are taking the first unsure steps toward the planning of a Center for Community Health. We hope that this will be a response to the needs (medical and social), the aspirations, and the medical care patterns of our community. This may be the first Health Service Center designed on the basis of an assessment of the community's needs and health practices. It is intended to be a facility which will include family-oriented medical care—preventive and curative, community nursing, essential social services, environmental health services, and health education in one setting, and we know that a building doesn't necessarily foster interdisciplinary communication.

It is true that we have a somewhat visionary dream of an integrated Community Health Center that would be the hub of the medical wheel, around which home care, hospital care, nursing homes, etc., should revolve. We are optimistic. There have been some encouraging signs of previous movement in this new direction. To cite a few: Philadelphia Community Nursing Services, Home Health Aide Program; the Home Nursing Care Program established between Community Nursing Services and Temple University Medical Center, the assignment of a coordinating city Public Health Nurse at Temple University Hospital; the establishment of a Comprehensive Medicine Clinic in our out-patient department, linking the services of medicine, psychiatry and social work; Temple's newest clinic, a small experimental Family Care Unit combining the services of an internist, pediatrician, psychiatrist, public health physician and social worker, and the establishment of a chair in Community Medicine.

Most encouraging of all is the recent statement by Dr. Ingraham, Philadelphia's Commissioner of Health, to the effect that we may expect problems in a new cooperative effort such as planning the Center for Community Health, but (Dr. Ingraham continued) these problems will be largely procedural and can be ironed out with persistence and hard work.

The basic principles involved are:

1. Public and Private cooperative ventures.
2. Integration of Human Services, health and welfare.
3. Integration of preventive, curative and restorative services.
4. Base the health center on a careful study of Community's needs, medical and social.

The frame of reference for this Health Center concept is found in the volume, *Health Care for the Community; Selected Papers of Dr. John B. Grant*, edited by Conrad Seipp and published by The Johns Hopkins University Press in 1963. I close with a pertinent excerpt from Dr. Grant:

> The modern concept of health care requires that all persons, regardless of their income level or the source of their financial support, regardless of their geo-

graphic location, and regardless of their race or creed or political beliefs, should receive prompt medical care of the appropriate types; whether involving the skills of physicians, dentists, pharmacists, nurses or other health personnel; offered in their own homes, in an ambulatory care center, or in a bed-care institution; for prevention, treatment, and rehabilitation of all illnesses or accidents, whether physical or mental, short-term or long-term, which science is capable of providing; offered in adequate quantity and quality for as long as may be necessary; with continuity and sensitivity to both the physical and psychological state of the patient and his social adjustment at work and to his family situation; and with maximum economy and coordination among the technical services provided.

This is our Goal.

Greater Philadelphia Committee for Medical-Pharmaceutical Sciences

By THOMAS M. DURANT, M.D., SC.D. (HON.)[1]

MEMBERS

Hahnemann Medical College
Jefferson Medical College of Philadelphia
Philadelphia College of Pharmacy and Science
Temple University School of Medicine
Temple University School of Pharmacy
University of Pennsylvania School of Medicine
Woman's Medical College of Pennsylvania
McNeil Laboratories, Inc.
Merck Sharp & Dohme
William H. Rorer, Inc.
Smith Kline & French Laboratories
Wyeth Laboratories

SUBCOMMITTEES

Advertising—Chairman, William F. Kellow, M.D., Hahnemann Medical College
Clinical Investigation—Chairman, Robert I. Wise, M.D., Jefferson Medical College of Philadelphia
Drug Reaction Registry—Chairman, H. William Harris, M. D., Woman's Medical College of Pennsylvania
FDA Liaison—Chairman, Christian J. Lambertsen, M.D., University of Pennsylvania School of Medicine

RECOGNIZING the need for greater cooperation between Schools of Medicine and Pharmacy, and the Pharmaceutical Industry, a committee was established by the Council of The College of Physicians of Philadelphia, and under its aegis, to deal with the problem. This committee, called the Greater Philadelphia Committee for the Medical-Pharmaceutical Sciences, held its first meeting in April 1963, and there have been eleven meetings since that time. The membership includes representatives of the five Philadelphia medical schools, its two schools of Pharmacy, and the five leading Pharmaceutical concerns in this area.[2]

Accomplishments to date include: (1) An effective liaison between the 3 groups, and a far better understanding by each of the problems faced by the others; (2) testimony before the Humphrey Committee (by Dr. Leroy E. Burney), plus resolutions and letters to various government officials presenting views of the Committee regarding the FDA functions and regulations; (3) the establishment of a subcommittee on Clinical Investigation under the Chairmanship of Dr. Robert I. Wise which is studying means of developing much needed personnel in this field; (4) the development of a Drug Reaction Registry in the 5 Philadelphia Medical School Hospitals, in charge of a subcommittee with Dr. H. William Harris as Chairman; and (5) the establishment of a Committee under the Chairmanship of Dr. William F. Kellow to study the problems of Medical Advertising.

Numerous outstanding persons have met with the Committee including Dr. William S. Middleton, Chairman, Drug Research Board of FDA, Mr. Boisfeuillet Jones, formerly of HEW, Congressman James D. Weaver of Pennsylvania and Dr. Kenneth G. Kohlstaedt of Eli Lilly & Co., Indianapolis. Dr. Joseph F. Sadusk, Jr., recently appointed Medical Director of FDA, will be at the next meeting. The importance of the work being done by the Committee is evidenced by the fact that a similar group is now being organized in Chicago. From such constructive activity we can expect progress in understanding and solving many of the complex problems facing the Medical-Pharmaceutical Sciences.

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[1] Chairman, Greater Philadelphia Committee for Medical-Pharmaceutical Sciences; President, The American College of Physicians.

[2] Greater Philadelphia Committee for Medical-Pharmaceutical Sciences. Under the Aegis of The College of Physicians of Philadelphia, 19 South 22nd Street, Philadelphia, Pennsylvania 19103. Thomas M. Durant, M.D., *Chairman*, Temple University School of Medicine.

Second S. Weir Mitchell Associates Banquet

By GEORGE I. BLUMSTEIN, M.D.[1]

THE second banquet of the S. Weir Mitchell Associates was held in Mitchell Hall at The College of Physicians of Philadelphia on Wednesday, September 30, 1964, to welcome the more than 40 new subscribers who became members since our first meeting (October 31, 1962), and to acknowledge the support given this project by the many Fellows who sponsored dinner meetings or otherwise solicited subscriptions from colleagues in the same specialty or institution.

Our President, Dr. John H. Gibbon, Jr., opened the meeting by welcoming the group as a whole and made special mention of several of our guests who were widows of deceased members of the S. Weir Mitchell Associates. He also introduced Mr. John A. Diemand, a friend and enthusiastic supporter of the College and a member of its Board of Advisors. He then called attention to the display of the periodicals that had been put together by our librarian, Mr. Elliott H. Morse, and subscribed to by the S. Weir Mitchell Associates and invited members to examine this rather extensive collection at the close of the meeting.

Bound periodicals in the Library of the College were not generally available for perpetual endowments until the adoption of the Resolution by the Council at its meeting on September 27, 1960, that formally acknowledged the formation of the S. Weir Mitchell Associates.[2] The College Library, with its rich historical background and its preeminent place among the medical libraries of the world, is a logical place for recording and preserving the thoughts and events of the day and the persons associated with them. Our Fellowship includes the names of outstanding practitioners, teachers, scholars and investigators in this area, many of national and international reputation. This program permits many of our permanent members to inscribe their names in the annals of Philadelphia medicine and to support the College Library program at the same time. If the adage about a good name being one's greatest heritage is correct, then one must acknowledge that there is no better or more permanent place

[1] Chairman, S. Weir Mitchell Associates Committee, The College of Physicians of Philadelphia; Clinical Professor of Medicine and Chief of Allergy, Temple University School of Medicine.

[2] Resolved that there be established a group of Fellows and Friends of The College of Physicians of Philadelphia known as S. Weir Mitchell Associates, and that a Committee of Fellows be appointed by the President to solicit membership in S. Weir Mitchell Associates of The College of Physicians of Philadelphia under the following rules: To become an S. Weir Mitchell Associate of The College of Physicians of Philadelphia, the individual or corporation must make a contribution of not less than $1,000, payable in from one to four years, to provide endowment for subscription, binding and cataloguing expense for one journal, the volumes of said journal to be identified with an appropriate book plate indicating the name of the donor. It is further understood 1) that the principal amount may be invested with the general funds of the College as from time to time recommended by the Finance Committee; 2) that whenever the Treasurer shall declare that the income has declined to less than twice the cost of the subscription, binding and cataloguing, the income above said costs shall be capitalized until this criterion is again met; 3) that any income not so required may be made available for the general expenses of the Library of The College of Physicians; 4) that if in the opinion of the Library Committee it should become undesirable to continue a subscription to a particular journal, or if the journal should cease to be published, the Librarian, (after consultation with the donor, if then living) may recommend assignment of the fund to another journal in the same or a related field, subject to approval by Council—such a change to be repeated as often as necessary to provide for the continued employment of the funds and the continued recognition of the contributor; 5) that contributions may be made in memory of an individual selected by the donor; 6) that all donations are subject to final acceptance by Council; 7) it is understood that any incomplete payments will be added to the endowment of the College for the Library.

to preserve it than in this venerable College and its Library.

The present enrollment of 128 represents 10% of our total membership, a degree of participation of which we are justly proud. The success of this program, therefore, must be attributed directly to the caliber of our membership and to their spontaneous support and participation in the S. Weir Mitchell program. Mention should be made of the fact that several Fellows have endowed more than one periodical and that specialty and local medical societies have also supported this program by endowments.

A project of this type could not be accomplished by any single individual and acknowledgments must be made to those who helped expedite and implement this program. First and foremost are the two Honorary Chairmen, Drs. Jonathan E. Rhoads and Thomas M. Durant, who singly or together attended every developmental gathering and spoke forcefully on its behalf. The late Dr. Leandro M. Tocantins was an early supporter and a tower of strength and inspiration during the early and formative stages of development. Credit is also due to the sponsors of our many dinner meetings. These include Drs. Katharine R. Boucot, Charles W. Charny, A. Reynolds Crane, O. Spurgeon English, John H. Gibbon, Jr., Benjamin A. Gouley, S. Leon Israel, Richard A. Kern, Merle M. Miller, Eugene P. Pendergrass, Edmund B. Spaeth, and Joseph B. Vander Veer.

Finally, a word about the future. Since the S. Weir Mitchell Associates was envisioned as an on going, self-perpetuating program, it is evident that the present group of Fellows will yield to succeeding generations of physicians and that each will assume the responsibility of administering this worthy endeavor. We look forward hopefully to the day when every scientific periodical in the College Library will bear the bookplate of the S. Weir Mitchell Associates, together with an appropriate legend concerning the donor.

A TOUR
of the
College of Physicians of Philadelphia

1787 *1965*

Printed for the

BICENTENNIAL OBSERVANCE
OF THE FOUNDING OF THE
SCHOOL OF MEDICINE
OF THE
UNIVERSITY OF PENNSYLVANIA

The College of Physicians of Philadelphia

By SAMUEL X RADBILL, M.D.

THE College of Physicians of Philadelphia was formally instituted on January 2, 1787. A *collegium* or association of physicians, it now has about 1200 members, called Fellows, of established reputation in teaching, research and practice. It is an independent medical society working constantly for the advancement and dissemination of medical science. The library is one of the largest of its kind in the world. It serves practitioners, teachers, students, research workers, writers and the entire public. It is open to all who seriously seek to use its resources. The Mütter Museum, originally a collection of pathological and anatomical specimens, was started in 1849 and augmented by Dr. Thomas Dent Mütter in 1863. It is now also a great exhibition hall of instruments, portraits and memorabilia which are of inestimable value in presenting the historical growth of the health sciences.

The meeting rooms are used by the Fellows for their regular meetings and special lectures, and by many other medical groups which are independent of the College. Ten thousand or more attend almost two hundred different meetings during any one year, while another twenty-three thousand use the library; more than two thousand each year find the Mütter Museum educational. The Medical Documentation Service supplies important needs in the field of medical communications; and there are individual study rooms available for the private use of scholars. Through the good offices of the Philadelphia Unit of the Herb Society of America, an extensive herb garden as originally envisioned by Benjamin Rush is now maintained.

The Building

Erected in 1909 through the generosity of physicians, Mr. Andrew Carnegie, and other public spirited citizens.

Over the entrance is the COLLEGE MOTTO:

NON SIBI SED TOTI
(Not for one's self, but for all).

Ground Floor

Vestibule: On each wall are lists of Founders, Presidents, Benefactors, etc.

After entering the building, circle from left to right.

College Office:

Oil portraits of:

3. S. WEIR MITCHELL (1829–1914) by F. Dvorak.
4. OLIVER WENDELL HOLMES (1809–1894) by Sarah W. Whitman.

Mitchell, a President of the College, was a pioneer neuro-psychiatrist, and Holmes, elected a Fellow of the College in 1892, taught anatomy; both achieved fame in American Literature.

Hutchinson Room:

Named in honor of James Hutchinson (1752–1793), a co-founder of the College, and James H. Hutchinson (1834–1889), a descendant and sometime Vice-President of the College.

On the west wall: an oil portrait of:

5. ROBLEY DUNGLISON (1798–1869) by Thomas Sully.

Dunglison, one of the country's great medical educators and authors, who was consulted by four Presidents of the United States, retired as Professor of the Institutes of Medicine at Jefferson Medical College in 1868, the year this portrait was painted for the Musical Fund Society of Philadelphia.

On the east wall: two charcoal sketches by John Singer Sargent:

6. SIR WILLIAM OSLER (1849–1919).
7. JOHN HERR MUSSER (1856–1912).

Osler and Musser, at different times, were each Clinical Professor of Medicine at the University of Pennsylvania. Osler subsequently became the patron saint of all English-speaking physicians.

The oil portrait in the center of this wall has been thought to be an early one of Benjamin Rush by Benjamin West.

Gross Library:

Samuel David Gross, surgeon, teacher and author, who was Professor of Surgery at the Jefferson Medical College, left his splendid library to the Philadelphia Academy of Surgery for permanent deposit in the College of Physicians of Philadelphia; a small portion of it is in this room. On the mantlepiece is his gold headed cane.

On the walls: oil portraits of:

8. SAMUEL D. GROSS (1805–1884), artist unknown.
9. SAMUEL W. GROSS (1837–1889), his son, by F. Y. Heberton.

Cadwalader Hall:

Named in honor of Thomas Cadwalader, friend of Benjamin Franklin, and one of the first teachers of anatomy in this country. He was an ancestor of Mary Cadwalader (Mrs. S. Weir Mitchell), who furnished this room.

On the east wall: oil portrait of:

10. THOMAS CADWALADER (1707/8–1779), a copy, artist unknown, of a painting by Charles Willson Peale.

On the west wall:

11. "THE ANATOMY LESSON", a copy, artist unknown, of a famous painting by Rembrandt.

This picture shows Dr. Nicolas Tulp, of the Amsterdam Guild of Surgeons, dissecting in 1632.

Mütter Museum:

Named for Dr. Thomas Dent Mütter, donor of the Museum, who was Samuel D. Gross's predecessor as Professor of Surgery at the Jefferson Medical College.

On the wall, inside doorway, to the right: an oil portrait of:

12. THOMAS DENT MÜTTER (1811–1859), by Daniel Huntington.

Thomson Hall:

Named in honor of William Thomson, Professor of Ophthalmology at the Jefferson Medical College.

On the west wall: oil portraits of:

13. WILLIAM THOMSON (1833–1907), by Thomas Eakins.
14. THOMAS S. KIRKBRIDE (1809–1883), by Howard R. Butler.

On the north wall: an oil portrait of:

15. JOSEPH LEIDY (1823–1891), by James L. Wood.

On the east wall: an oil portrait of:

16. CHARLES L. LEONARD (1861–1913), by Benedict Osnis. And sepulchral mural tablet of
17. MUNDINUS, from the portico of the Church of St. Vitale, Bologna, 1318.

Kirkbride was Superintendent of the Pennsylvania Hospital for the Insane for forty-three years; Leidy was Professor of Anatomy at the University of Pennsylvania; and Leonard was a pioneer radiologist at the same school, who became a martyr to the x-rays. Mundinus (Mondino de' Luzzi, c. 1275–1326) was Professor of Anatomy at Bologna, Italy, whose classic book on anatomy, completed in 1316, was first printed about 1475.

President's Room:

On the walls: oil portraits of:

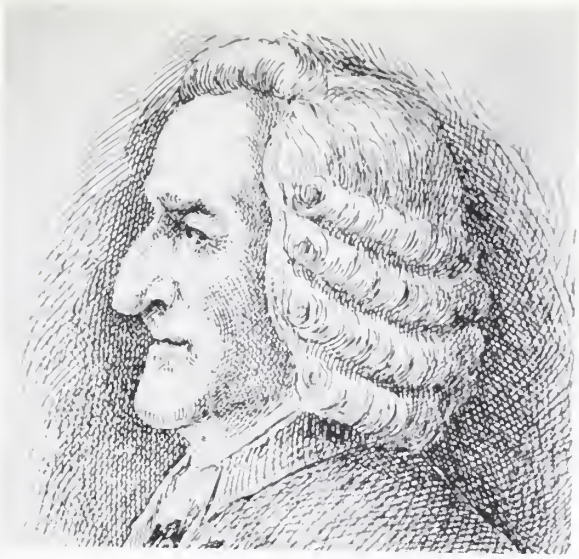
18. WILLIAM W. KEEN (1837–1932), by James L. Wood.
19. GEORGE McCLELLAN (1849–1913), by Julian Story.

Keen, Professor of Surgery at the Jefferson Medical College, operated upon President Cleveland in 1893. McClellan, Professor of Applied Anatomy at Jefferson, was a grandson of the founder of that Medical College, and nephew of the great Civil War general, all of them bearing the same names.

22.* JOHN MORGAN
(1735–1789)

Founder of the Medical School of the University
of Pennsylvania, 1765
Co-founder of The College of Physicians of Philadelphia, 1787
Earliest Recorded Donor of Books to the
College Library, December, 1788

* Portraits will be numbered to correspond with the numbers in this tour guide.



2. JOHN REDMAN
(1722–1808)
(Artist unknown)

First President of the College

FOUNDING FELLOWS

Senior

John Redman
John Jones
*William Shippen, Jr.
*Benjamin Rush
Samuel Duffield
*James Hutchinson
Abraham Chovet
*John Morgan
*Adam Kuhn
Gerardus Clarkson
Thomas Parke
George Glentworth

Junior

Robert Harris
Benjamin Duffield
John Foulke
James Hall
Andrew Ross
William Currie
John Carson
William W. Smith
*Samuel Powel Griffitts
John Morris
William Clarkson
Benjamin Say

* Member of the medical faculty of the College of Philadelphia (now the University of Pennsylvania).

Stairway:

On the landing: a marble statue of:

AESCULAPIUS
"God of Medicine"

An exact copy, by an unknown sculptor, of a statue in the Vatican, for which the youthful Emperor, Marcus Aurelius, is said to have been the model.

Upper Hallway:

Oil portrait of:

20. NATHANIEL CHAPMAN (1780–1853), by Thomas Sully.

Chapman, Professor of the Theory and Practice of Medicine at the University of Pennsylvania, and President of the American Philosophical Society, was the first President of the American Medical Association.

In this hallway may be seen, also, in addition to other portraits, two cases containing unusual memorabilia of famous medical scientists.

Facing the stairway:

Mitchell Hall.

Named in honor of S. Weir Mitchell, a President of the College, whose portrait, by R. W. Vonnoh, surveys the auditorium from directly above the President's chair, and is surrounded by oil portraits of the following co-founders of the College:

21. WILLIAM SHIPPEN, JR. (1736–1808), artist unknown.
22. JOHN MORGAN (1735–1789), by Isaac Craig, after Angelica Kauffman.
23. ADAM KUHN (1741–1817), by Louis Hasselbusch, from a wax bas-relief.
24. BENJAMIN RUSH (1746–1813), by Adele von Helmhold, after Thomas Sully.

These constituted, at the time of the founding of the College of Physicians of Philadelphia (1787), the entire medical faculty of the University of Pennsylvania. Rush is further remembered as a Signer of the Declaration of Independence; he, as well as Morgan and Shippen, had also served as head of the Medical Department of the Revolutionary Army.

On the west wall: oil portraits of

25. JAMES HUTCHINSON (1752–1793), artist unknown.
26. GEORGE GLENTWORTH (1735–1792), by Albert Rosenthal, after Charles Willson Peale.

Both were co-founders of the College, and had served in the Medical Department of the Revolutionary Army. Hutchinson was Professor of Chemistry at the University of Pennsylvania.

By the north wall: a bust of

27. S. WEIR MITCHELL, by William Ordway Partridge.

To the right of the hallway, facing the stairway:

Norris Room.

Named in honor of William Fisher Norris, first Professor of Ophthalmology at the University of Pennsylvania.

On the south wall: oil portraits of

28. WILLIAM FISHER NORRIS (1839–1901), by M. H. Kevorkian.
29. GEORGE W. NORRIS (1808–1875), by M. H. Kevorkian, after Matthew Wilson.
30. JOHN LIGHT ATLEE (1799–1885), artist unknown.
31. WASHINGTON L. ATLEE (1808–1878), by Jacob Eichholtz.

George W. Norris was Clinical Professor of Surgery at the University of Pennsylvania and at one time Vice-President of the College of Physicians of Philadelphia. The brothers Atlee, members of a prominent Lancaster, Pennsylvania, family dynasty of physicians, revived the operation of ovariotomy; both were Fellows of the College.

Behind the partition is the:

Packard-Krumbhaar Medical History Alcove:

Named for Drs. Francis R. Packard and Edward B. Krumbhaar, former Presidents of the College, widely known for their achieve-

ments in the field of medical history, and for their significant contributions to the Historical Collections of the College Library.

On the north wall:

32. JOHN JONES, Certificate of Fellowship in The College of Physicians of Philadelphia.

John Jones (1729–1791), first Vice-President of the College, Revolutionary War surgeon and author of the first American book on surgery, was the first Professor of Surgery in the Medical School of King's College, New York, now Columbia University's College of Physicians and Surgeons—the second oldest medical school in the country.

On the west wall:

33. "LIBRARY AND SURGEON'S HALL, IN FIFTH STREET, PHILADELPHIA", W. Birch & Son engraving published in 1799.

Surgeon's Hall was the first building used exclusively for teaching medical students by the Medical School of the University of Pennsylvania.

Across the hallway from the Norris Room:

Ashhurst Room:

Named for John Ashhurst, Jr., Professor of Surgery at the University of Pennsylvania and onetime President of the College.

Oil portraits: over the fireplace:

34. JOHN ASHHURST, Jr. (1839–1900), by John Lambert, Jr.

On the south wall:

35. JOHN CARSON (1752–1794), by Rembrandt Peale.
36. CASPAR WISTAR (1761–1818), by Ida Waugh, after Bass Otis.

John Carson, a co-founder of the College, was one of the first attending physicians of the Philadelphia Dispensary when it was opened in 1786, and so was Caspar Wistar, who became Professor of Anatomy at the University of Pennsylvania and President of the American Philosophical Society, and whose name is perpetuated by the Wistaria vine.

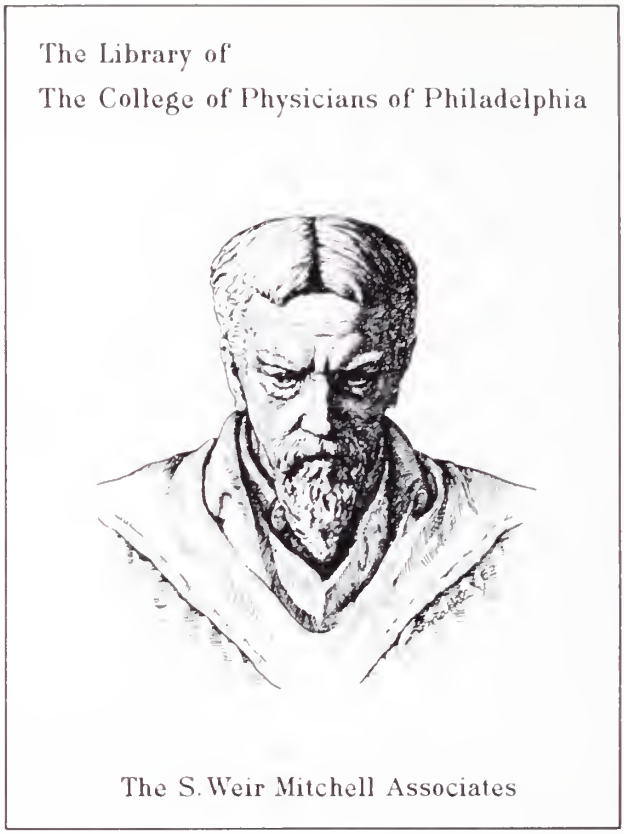
At the east end of the Ashhurst Room, enter the

Librarian's Office:

An oil portrait of:

37. PHILIP SYNG PHYSICK (1768–1837), by R. F. Reynolds, after Henry Inman.

Physick, "Father of American Surgery", was Professor of Surgery at the University of Pennsylvania.



Bookplate designed by Miss Edna Hill, medical artist to the Hospital of the University of Pennsylvania, for use by The S. Weir Mitchell Associates of The College of Physicians of Philadelphia (*1962*).

This brochure was prepared by Samuel X Radbill, M.D., Fellow of the College, with aid from W. B. McDaniel 2d, Ph.D., Curator of the Library Historical Collections, and Mrs. Ella N. Wade, Curator of the Mütter Museum.

John Morgan's Medical Thesis, 'Pus Production', Edinburgh, 1763

Translated by MARIA WILKINS SMITH*

With an Historical Introduction by Whitfield J. Bell, Jr., Ph.D.†

Historical Introduction

JOHN Morgan was one of the first generation of American medical students who went to London and Edinburgh to study, and his achievement and reputation as a student and young graduate of the Scottish university were greater, perhaps, than those of any of his contemporaries. His instructors and fellow-students without exception spoke of his abilities and prospects in superlative terms;[1] and Dr. John Bard of New York urged his son Samuel at Edinburgh to cultivate Morgan's acquaintance as something likely to benefit the young man in both his medical studies and in his future career. No less striking was Morgan's social success. He became an intimate in the families of the Lord Provost George Drummond and of Sir Alexander Dick, president of the Royal College of Physicians of Edinburgh, and received the freedom of the burgh of Stirling. He brought this period of his life to a close in the spring of 1763 when he was elected a freeman of the city of Edinburgh and received the degree of doctor of medicine from the University.

His dissertation was on the formation of pus. Though several anatomists and pathologists had considered the subject, none had treated it systematically or come close to explaining the cause. Thomas Simson, professor of medicine at St. Andrews, had hinted at the truth in his *De Re Medica Dissertationes Quatuor* in 1726; and in London John Hunter, with whom Morgan lived as a student in the winter of 1760–61, may already have been interested in the subject, which later deeply engaged him. The manifest importance of suppuration drew students to consider it. James Blair of Virginia discussed it in a meeting of the students' Medical (now the Royal Medical) Society, as did Morgan himself.[2] In the fall of 1762 he was at work on the dissertation; his friend William Hewson, now assistant to Dr. William Hunter in London, was impatiently awaiting its completion and offered meanwhile to send Morgan any quantity of purulent matter he needed for his work.[3]

Morgan's dissertation won some acclaim on its merits (though Monro was said in 1767 to reject it),[4] and he distributed copies widely among friends and professional colleagues in Edinburgh and London as well as in Philadelphia and in other parts of America. When he went to France and Italy in 1763–64 he carried copies of the dissertation with him, and presented a French translation of it to the Académie Royale de Chirurgie in the hope that

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† American Philosophical Society, Philadelphia, Pennsylvania 19106.

[1] "Dr. Morgan has graduated at Edinburgh with such Reputation as few, if any, have ever obtained. The Professors speak of him as a Man high in the list of Physicians." Samuel Powel to Samuel Morris, Sept. 2, 1763, in Robert C. Moon, *The Morris Family of Philadelphia* (Philadelphia, 1898), II, 469.

[2] Morgan included in his dissertation a special tribute of respect and appreciation to the Medical Society. Warmly approving its sentiments on the benefits of such student societies, John Fothergill quoted Morgan's dedication in full in his *Essay on the Character of the late Alexander Russel, M.D., F.R.S.* (London, 1770), 8.

[3] William Hewson to John Morgan, Dec. 14, 1762, in Joseph Carson, *History of the Medical Department of the University of Pennsylvania*, I, 119 (extra-illustrated, College of Physicians of Philadelphia).

[4] Benjamin Rush to Jonathan Bayard Smith, April 30, 1767, L. H. Butterfield, ed., *Letters of Benjamin Rush* (Princeton, 1951), I, 41.

JOHN MORGAN, M.D., F.R.S.

This silhouette, according to a notation on the back in a hand which appears to be that of Dr. William Shippen, Jr., was once in Shippen's possession, but was presented by him to his student Dr. Henry Rose of Alexandria, Va. From the original in the Richmond, Va., Academy of Medicine.

they would publish it. Some years later Hewson had occasion to cite Morgan's "ingenious Dissertation" in his own description of the lymphatic system;[5] and Nicholas Romayne of New York cited it in 1780 in his Edinburgh dissertation *De Puris Generatione.*[6]

Meanwhile, in London, John Hunter was continuing his studies of wounds, and by 1775 he had advanced so far in his understanding of suppuration as to claim priority for his discovery. In a lecture on December 8, 1775, as recorded by young James Hutchinson, a medical student from Philadelphia, he asserted:

> The Idea of Matter being produced by Secretion is not new, as it was Published by Dr. John Morgan of Philadelphia in a thesis he wrote at Edinburgh at the time he graduated in the Year 1763. This theory he Published as his own. Mr. Hunter however says he had this doctrine in his Mind in the Year 1759 at which time he lodged in the same house with Dr. Morgan but whether he Mentioned it to Dr. Morgan or whether he took it up himself he cannot pretend to determine at this time; however he has no doubt but what the formation of Pus is by Secretion as he has no Conception of the fluids becoming Pus Spontaneously. . . .[7]

This charge was never published and it had no wide circulation among the medical profession in Philadelphia. In later lectures Hunter seems to have made no mention of Morgan, and the American's name does not appear in the exhaustive discussion of the formation of pus in the *Treatise on Blood, Inflammation, and Gun-Shot Wounds.* The result was that for a full generation after the publication of his book, Hunter was thought to have been the first who understood that pus is formed by a secretion of the blood vessels.

In 1817, however, James Curry, for sixteen years a teacher in the medical school of Guy's Hospital, published in the *London Medical and Physical Journal* a note "On the Author of the Theory concerning the Secretion of Pus," which asserted that it was Morgan, not John Hunter, who first stated that pus is a secretion.[8] Morgan, Curry declared, had discussed the subject with great ingenuity, and there was no evidence to show that Hunter had taught or even adopted such a theory until much later than 1763. He suggested that as Simson had given a hint of the doctrine, Morgan might have received the idea from him, as the latter's book was common among the medical students at Edinburgh.[9]

Curry's article was reprinted at once in the

[5] William Hewson, "A Description of the Lymphatic System," in *Works,* George Gulliver, ed. (London, 1846), 165. See also Morgan to Hewson, Oct. 18, 1769, Hewson Family Papers (film), American Philosophical Society Library.

[6] Romayne cited Simson as well; in his turn, he was cited by Karl Richard Hoffman, *Sententia de Suppurationis Natura* (Erlangen, 1818), 4.

[7] "Doctor James Hutchinson to Dr. Logan," ms. in Historical Society of Pennsylvania.

[8] Volume XXXVIII (1817), 196–97.

[9] Morgan visited St. Andrews in the summer of 1762, but it is not known that he called on Simson.

New-England Journal of Medicine and Surgery,[10] and Charles Caldwell called attention to it in his edition of Cullen's *First Lines of the Practice of Physic*. "For the honour of American medical literature," Caldwell asserted, "this essay ought to be republished, and every physician of our country should qualify himself to read it in the language in which it appears."[11] Despite Caldwell's call, the essay was not reprinted in his day; and in ours few physicians could read it in its original Latin. It is therefore printed herewith in an English translation.

Morgan's footnote references were inconsistent, incomplete, and confusing to a modern reader. They have therefore been checked and expanded in accordance with modern practice, with citations to editions Morgan could have seen. Where the author did not include a page reference, none has been given here; and if he mentioned a medical authority but cited no published work no attempt has been made to supply the deficiency. A few references could not be found; they have been left as Morgan wrote them.

[10] Volume VI (1817), 404–05.

[11] William Cullen, *First Lines* (2nd edition, Philadelphia, 1822), I, 213n.

Pus Production

By JOHN MORGAN

TO THE

SOCIETY OF MEDICAL STUDENTS

AT THE

ANCIENT UNIVERSITY OF EDINBURGH

MOST RESPECTFUL GREETINGS

FROM

JOHN MORGAN

SINCE the subject of this dissertation for the doctorate, now at last appearing, has not hitherto been among those required by your regulations, before you chose anyone as worthy of inclusion in the roster of your associates, I hereby acknowledge the gratification caused me by the honor you have done me. I will do my best to prove myself not unworthy, with due consideration for the discretion, order and propriety with which your proceedings are conducted. On the one hand are freedom and candor, on the other is just and kindly goodwill, as I know by personal experience. Thus, in accordance with your very sound ruling that only the most practical subjects be discussed, all topics cooperate advantageously to the progress of medical knowledge.

As to the investigation with which I, having received your approval, am about to deal, I have only to mention a number of well known men who have directed their attention to it, for example: Boerhaave, Van Swieten, Grashuis, Pringle, De Haen, Hunter. Thus may its immediate practicality and importance be obvious. What will be most evident until such time as we shall have reviewed it, is the strong bond existing between the subject of this investigation and the problems of blockage, inflammation, paralysis, suppuration, gangrene, swelling, fever, the theory of traumas and the syndromes depending thereon. We must consider, too, the site, character, causes, effects, symptoms and remedies for these disorders. These are all matters essential to the knowledge of those who practice medicine.

My coming departure to my native land is not so imminent that I may not first take farewell of you and declare publicly what great pleasure and, I hope, profit, I have enjoyed by being at this university and present at your meetings. Furthermore, in the distant reaches of America, there will come to my mind, and relive for me, from time to time, the beloved and happy memory of my studies at Edinburgh, where all that delights and improves the mind is available, and where brief homesickness for one's own country and one's own friends is counterbalanced by the great gain here obtainable.

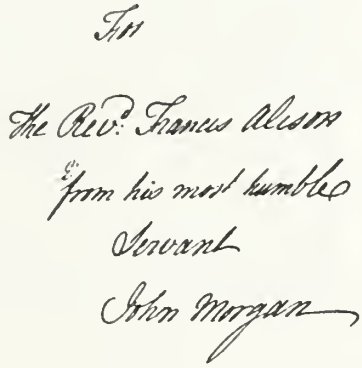
Meanwhile I congratulate you who have come here from distant places in order to study, because here you will find contact and friendship with men who are both open-minded and friendly. Here, too, are all possible aids to learning, literature, liberal arts, science—everything that embellishes a man, be he a layman or a doctor.

Now, at this point, because I cannot repay your kindness, may I at least attest to my sense of gratitude for the countless instances of good will, friendship and kindness that have been heaped upon me while I was pursuing my studies in this city. I mention in particular G. Drummond, the most worthy magistrate of this city, one who is both careful of its safety, comfort and beauty, and extremely helpful to its learning. Then I should mention Sir Alexander Dick, Bart., the most distinguished President of the Edinburgh College of Physicians, Dr. Robertson, Chief Provost of the University, and some other outstanding professors. Among these must be included the famous

rhetorician, Dr. Blair, and the widely known Ferguson, both professors of Natural Philosophy, whose combined friendship I have enjoyed. Then, in particular, I would mention our professors of the Medical Faculty, men always most eager to teach us and equip us for our profession viz.—the well known and learned Rutherford, Cullen, Whytt, both Monros, Young and Hope. From them we may clearly learn medical theory and practice, materia medica, method of treatment, medical laws—all of which we see explained and established by the observation of patients in the Public Hospital. In charge of the hospital are those outstanding doctors, David Clerk, and my own very kind friend, Colin Drummond.

Continue, then, most devoted and most beloved Associates, in the task already begun, of raising to the stars the reputation of the Medical Society. The most outstanding doctors of whom Britain now boasts have labored toward this end and advanced therein. Therefore, there should never be lacking, either in Great Britain or in her colonies, a succession of physicians who will always bring lasting fame and honor to themselves and their country along with welfare to the human race.

FAREWELL



DE

PUOPOIESI,

SIVE

TENTAMEN MEDICUM

INAUGURALE

DE PURIS CONFECTIONE.

PRESENTATION COPY OF MORGAN'S THESIS

Half-title page of John Morgan's Edinburgh dissertation with the inscription presenting the copy to Francis Alison, vice-provost of the College of Philadelphia, one of the author's undergraduate teachers.

PUS PRODUCTION

or

A MEDICAL CANDIDATE'S INVESTIGATION OF THE MAKING OF PUS

CHAPTER I

VARIOUS OPINIONS CONCERNING THE NATURE OF PUS DISPUTED

I. The production of some sort of pus in the living body and what sort of beginning it has—this is a pathological question, to explain which is as difficult as it is useful. Many of the most learned men have applied their intellects to its explanation. Nevertheless, the individual theories so far devised, albeit original and very penetrating, are offered with many questions still to be answered and with no real reasoning on the part of the individual author to establish his own idea.

Various Ideas About Pus

II. The theories proposed by learned men, theories most persons have followed in preference to the rest, should here be presented first.

Let us begin with Boerhaave. That great man taught us: "Pus arises from fluids carried to an injury, and poured into the injured spot. The area having been rubbed together with solid elements and having become slightly foul, all the materials become mingled together into one homogenous, white, thick, viscous, fatty serum" [1].

The illustrious Baron Van Swieten, who wrote outstanding commentaries on the statements of Boerhaave, seems to have adopted an identical, or at least, similar opinion, for he says: "Pus is not made in the blood-vessels but is bred in the injury, outside the blood-vessels, by scattered fluids warmed and changed by the body temperature" [2].

The famour Grashuis says: "Pus seems to be a miscellaneous combination of various different elements, a few of them solids, a great number of them liquids, all having been changed into one homogenous fluid. Their origin is primarily derived[3] from a fatty substance, much changed from its natural state by the heat of inflammation and by the onset of festering. With this stagnant substance are mingled other fluids pouring from blood-vessels born at the same time as the cellular membrane. It, the pus, is at first immature, its fatty substance not yet ripened nor thickened, and it is continuously carried along through the aforesaid blood-vessels and deposited in the now ruptured tissues" [4].

The learned Pringle thinks otherwise: "Liquid in some undiscovered way undoubtedly drains into every sore spot, but due to the warmth of the surroundings and to the volatile character of living fluids, the whole thing is suddenly spread beyond the original element itself, which remains in the wound in the form of pus" [5].

Now the famous De Haen persuades himself thus: "Pus can originate in the blood and frequently issue from the body in great quantity over a long period of time, although nowhere concealed by any pockets. It is even thought to have been formed by preceding inflammation from some sort of inflammatory material produced in the blood from different sources" [6].

Finally, since this review is nearing its end, I have had for myself the pleasing opportunity of surveying what has been recently written on the subject. The very widely known W. Hunter says: "Pus has a double meaning. One kind accompanies the obvious breakdown of solid tissues, such as we see in the ordinary ulcer; the other is gathered over the inner surfaces of pockets already beset by inflammation, without visible ulceration and without a break in the unity of the said materials. This is an inflammatory discharge. The conclusion is that inflammation always precedes pus, or that the latter is caused by the former. Let us postulate an original fluid consisting of juices held within swollen blood vessels, this fluid remaining in that part of the vessels released or liquified by suppuration." Later he asserts[6]: "Pus possesses merely the ordinary character of thickened serum. It is present in every healing wound, and is derived from fluids only, not from a mixture of fluids and solids" [7].

A New Hypothesis

III. Since no one of these ideas, nor any others known to me, as to the production of pus, has fully agreed with what long ago appeared to me most likely, I think it appropriate to have collected the theories having the most influence, so that they may be examined in a single survey. I have compared them with one another carefully before daring to interpose my own among them; lest I seem through my own ignorance to have differed with the opinions of better known scholars, and so to have proposed something new inadvisedly. Moreover, so long as men of real authority differ as to the production of pus, the subject requires the most careful consideration. In a disagreement among so many opinions, surely I, too, may be permitted to offer my own, namely that *the production of pus is the work of a living organism, very similar to a secretion. In fact, it is the secretion of a*

special fluid, developed from the blood of a living being, made by the power of the blood-vessels adapted to the purpose and developed in accordance with the proper stage of a preceding inflammation.

How This Differs From The Preceding

IV. From the foregoing it is clear that the illustrious Boerhaave and all who embrace his theory, teach that pus is produced neither in the blood nor in the blood vessels, but is generated by fluids only, or by a mingling of fluids and solids. It is clear, too, that the distinguished De Haen states that pus is produced in the actual mass (or material) of the blood, and that inflammation is not necessarily present in order for pus to be formed. It is also clear, that the renowned Hunter, in common with the generally accepted idea, asserts that inflammation does precede the generation of pus. My own theory has this particular point—that pus certainly originates neither in the blood nor outside the blood-vessels; but *within* the blood-vessels themselves when inflamed and that the blood-vessel changes induced by inflammation are the effective causes that by a kind of secretory power, draw the pus out of the blood. Still, with the passage of time and with warmth, it can undergo further changes as can any secretion after its separation.

Weaknesses

V. I thought it foreign to my purpose to dwell upon the objections that can be brought against the theories of others. My object is, rather, to establish my own theory with the strongest possible arguments and to try to solve the doubtful points that oppose it.

Before entering on this task, in case I have failed to accomplish it, may I prepare my excuse beforehand by observing with the famous Gaubius[8] that the physiology of body fluids suffers from many disadvantages. These present an obstacle to my being able to explain away many aspects of body fluids. Furthermore, I do not doubt that learned men, usually the more sincere because the more learned, will be unprepared to look kindly upon the attempts of a young man in a difficult subject, thus discouraging similar attempts in others.

Assuredly, few facts have been thoroughly understood regarding the physiology of body fluids; assuredly, too, many facts lie undiscovered and will so lie, perhaps for a long time. Our body fluids, very different from those of plants, finally become living things by a series of changes, reluctant as we are to perceive and record the fact. We scarcely know how and to what extent our food is changed in the stomach. It is still an open question as to whether the food there undergoes some kind of fermentation, or what the fermentation is like. Physicians do not well understand the contribution of saliva, of gastric juice, and of air, both that admitted from outside and that caused by the warmth and the fermentation of the food itself. Next, what the bile, the pancreatic juice, and the intestinal fluids contribute toward the making of chyle is not positively established. Nor, indeed, is it any more certain how much the lymph in the ducts transmitting the chyle, may change the chyle itself when they spread through it. In these early stages that our body fluids undergo, water often clings to us and does not easily go on with the fluids that follow. After the chyle has been formed, how the blood is finally made from it and through what succession of changes is scarcely clear. Only very recently have the stages of this combination been somewhat cleared up. There is still disagreement as to the character and size of the parts, what is really present in the blood, whether, or not, there is mucus, gelatin, oil, one or more other elements—on these questions the doctors do not agree among themselves. Therefore, since the nature of blood is still a matter of uncertainty, it is not surprising that physiologists have propounded so little that is certain about the fluids secreted from the blood. On the one hand, were the fluids, as such, already present in the blood and, through

straining done by the blood alone, did they become separated from each other, *or*, being as yet not formally present in the blood, do they, through some glandular activity, become the result of a change in the blood itself—this question has not been clearly determined. Likewise, it is not clear what is the effect of the size, proportion, varying distances from the heart, of these blood-vessels that affect the apparatus of the secretions. In short, there seems to be nothing in the living organism more mysterious nor more difficult to understand than the secretion of fluids. If we are right in saying that pus is made by secretion, then we are involved in the same problems as in the case of other secretions. I hope that in so difficult a problem, my judges will be the less difficult and that, before condemning me for lack of insight, they will consider in their own minds how minute and invisible are the beginnings of subjects which, perhaps, we may never penetrate even by guess-work. Let us rather then, acknowledge our ignorance, and let us revere the Wonderful Maker of all things, One to be worshipped in the smallest details, One who has imparted such great and marvelous potency to such minute beginnings.

Whatever we examine with either eyes or mind, exhibits supreme harmony, adapting not only causes to ends, but also individual parts to one whole. Likewise there is exemplified a wonderful fitness for the performance of an intended function. Hence come symmetry, order, beauty, and utility. Hence are presented for our admiration supreme wisdom, that has planned everything, divine intelligence that has fitted each thing to each other thing, and the astonishing power that has perfected the whole. Thus all things fit together so that they remind us of the dullness of our minds and clearly show that here is something beyond man's mental grasp, something that comprehends all these marvels. (We cannot doubt) that here is God, the Best and the Greatest, the Originator of the universe, God, Who by His incomprehensible creation, prescribing by His Own laws to each its own, has wished us to understand by the works of His hand, His wisdom, power and plan. The immortal Harvey[9] and the outstanding Bellini[10] have gracefully expressed these thoughts.

The Plan To Be Followed In This Short Treatise

VI. Let me, however, return to the matter at hand. Whatever arrangement of my subject-matter may be open to criticism this seems to me to be the one to follow, that attention be turned first to the general phenomena so far as they are known, then to the making of body fluids, finally to what is closely related to pus itself. Next I shall make use of what others have observed, omitting their theoretical conclusions, and, after weighing the subject carefully, shall try to bring into clearer view the truth wherever it may be hidden. Finally, by connected and consistent argument, I shall try to uncover the true origin of pus.

What I offer as guesses, I want regarded merely as guesses, destined to find credence only in so far as they seem likely. Lest I seem to rely solely on my own authoritative judgment, which has no authority, I have consulted the weightiest writers on the secretion and the change of body fluids. Also, lest I incur the risk of a mistake, I have relied on such observations as have been most widely known and most generally accepted, and on those mentioned by the most famous physiologists who have best written on both the plant and the animal kingdoms. Here I mention especially the renowned Ruysch, the immortal Boerhaave and the illustrious Haller, not to speak of many others. The laws of both kingdoms (animal and vegetable), as explained by the foregoing, have supplied me with not a few suggestions. I have employed only those upon which all have agreed, in order to establish my own theory of pus production, although it was never adopted by them. I make no secret of the fact that I owe to my own outstanding Professor Cullen some practical observations which he had made during his clinical lectures.

CHAPTER II

The Need of Inflammation for Pus Production

Inflammation Essential to Pus Production

VII. No one, I think, will deny that the blood-vessels are always injured by changes arising from inflammation, according to the extent of the inflammation present. It is equally true that inflammation always precedes the building up of pus. This theory the distinguished De Haen does, indeed, deny, but, as I think, without sufficiently strong arguments. Not only a long series of careful observations, but also an agreement among all practising physicians, have proved the truth of this statement. Even the medical histories that he presents in order to contradict this theory rather confirm it, because therein are found the recognized symptoms of inflammation, as I hope to succeed in demonstrating.

Pus always betrays disease, and shows that the condition of the blood-vessels wherein it originates has varied somewhat from that of perfect health, for pus can never be produced in blood-vessels that are wholly and positively healthy. In order to learn whether the build-up of pus always has accompanying inflammation, it is proper to consider, within the present limits of this dissertation: (1) What does suppuration indicate? (2) Review the conditions predisposing to the formation of pus. (3) Inquire into the nature of inflammation as such. From the careful weighing of all these questions, something positive can be deduced.

Definition Of Suppuration

VIII. Suppuration is often a healthful necessity of the animal kingdom. By it all that stops the life-giving flow of body fluids is carried away by the vital force remaining in the affected area, pus having been produced and ejected from the blood vessels.

Various Causes Of Suppuration

IX. All the conditions that stand in the way of this vital movement of the body fluids, and so predispose them to the production of pus, can be divided into two kinds: those that do harm when applied from without, especially traumas, and those that seriously upset the circulation of blood and body fluids so that they make some part of them disappear altogether.

To the first group belong not only everything that breaks the blood-vessels such as sharp tools, or those things that destroy them by wounding, bruising, tearing, piercing, burning, corroding, but also whatever conditions may too greatly increase or decrease the normal flow of the body fluids within the blood-vessels, such as the dividing, rubbing, stimulating, heating, chilling (actual or potential), contracting—in other words, anything that stops up the body's passageways, such as a severe accumulation of fat, coagulation, and other phenomena of this type. In the second group are included narcotics, various acids admitted into the blood, and materials of similar character.

From the different causes listed above arise certain common effects, in particular, blockage and after it, fever, either in the whole body or in the affected area. The symptoms usually accompanying it are swelling, pain, heat, flushing, tension, fast pulse and thirst. Some of these are occasionally hardly noticeable, or they can be entirely absent, especially if the blockage is not extensive and if the fever is confined to a single location. Then the fast pulse and thirst pass unnoticed, and the rest of the symptoms are milder, but the blockage and the fever are inseparable companions.

How the blockages arise from the aforesaid causes will be obvious from what follows.

How External Contacts Cause Blockage

X. Things that cause wounds, everything that, in any way, tears, breaks, wears down or bruises the blood-vessels, such as the lumps from being slapped, or as missiles, cause the

fluids to leak out and the walls of the blood-vessels, being cut or torn, to contract their passing by their non-elasticity. Thus begin tumors and blockage. A separative force contracts the hollow part of the blood-vessels and so creates blockage. Through too much friction the red part of the blood is forced into a great many smaller vessels that it does not ordinarily reach, so that an ensuing redness shows the presence of friction—hence blockage. Stimulants arouse the circulation too much and all normal functions are thrown out of kilter, hence, of necessity, arise blockages, fever, and various kinds of ailment. Fever, sufficiently elevated, thins the blood, hastens circulation, produces blockages, stimulates the heart, and, by its own violence, destroys the smallest vessels. Chills work by their active power. At first they contract the blood-vessels, increase the circulation and its penetrative driving power, whence often follow the worst types of blockage. Later these chills so slow up the circulation that the molecules cannot pass through the narrow ducts of the blood-vessels and thus, in their own way, cause blockage.

Astringents reduce the size of the blood-vessels and produce the same effect as those arising from chills. Acid fat ointments cling stubbornly to the skin, render it impervious to air and so blockage follows. An acid mixed with others and fixed in one spot arouses the blood vessels by its stimulus to more frequent rounds of the circulation, and brings on a temperature. Some more biting substances applied to the body—acids, alkalines, caustics, pungent experimental oils—these destroy the blood—vessels and bring on blockage and other symptoms, the same as do wounds. Coagulants, by thickening the fluids and narrowing the vessels, cause blocks.

How Outside Causes Create Blockage

XI. Narcotics can achieve the same effects as those caused by the influence of chills. For, through their action the circulation slows down, the vital force that is measured by the drive of fluids through the blood-vessels is diminished, and blocks are built up by the reduced activity of solids in the narrow vessel passages. This is especially true of any area that has previously been affected by either weakness or rigidity. Various types of acid, creeping deceptively into the blood as if masked, having planted seed, deploy themselves and arouse both movement and warmth of life. Thus they upset many normal functions, irritate solids, pollute fluids and produce irregular blockages of both. By swifter movement they make contact with similar phenomena either by their own activities, or by some other, too violent, method. Such causes produce manifold ills, spread the liquid part of the blood too thin, and cause different kinds of blockage.

Various Results Of Blockage

XII. The blocks arising from the aforesaid sources end variously in the breakdown of tissue, in suppuration, in gangrene, or in incurable tumors, but, at the moment, only the question of suppuration is under discussion.

The Condition Of A Blocking About To Become Suppuration

XIII. It is an essential condition of blockage on the point of turning into suppuration that the circulation should increase, though not too much, over what it is in a state of health. Thus the walls of the blood-vessels, because of the fluid pushing from behind into the obstructed area, already stretched by constant pressure, the strength and speed of the circulation increased by the accompanying fever, these walls begin to be torn apart in front of the block. Thus, as a result, fluids are perceptibly discharged or else the lumens are so enlarged by stretching that the fluids can now filter through them. The aforesaid pushing from behind also wears away the molecules by attrition. For, while closing off the blood-vessels, they do not always stand motionless, but can be forced back into the same narrow passages—now driven backwards to a roomier spot by the contraction of the arteries, now

forced forwards by the contraction of the arteries. The circulation, now greater than in time of health, and the blockage do away with the idea of inflammation.

What Is Inflammation?

Inflammation is blockage accompanied by fever, present in the whole body, or, at least in the area affected.

Fever Follows Inflammation

XIV. When genuine inflammation has attacked any more noticeable part of the body, or certain of the internal organs, then fever is always perceptibly present. "If, however, the inflammation sticks to a very small area especially to an outer part, then only partial fever is present and often no change is perceptible when the pulse is counted." These are the words of the illustrious Van Swieten.

Regional Fever

XV. The ancients thought that there existed a regional type of fever and some later authorities have followed them.

Regional fever is mentioned by Galen: "Certainly this kind of inflammation has something that changes the pulsation throughout the whole body, on account either of its own importance or of that part in which it is present. If, in fact, it does not affect the entire body, then the pulse in the inflamed part will be such as we have described"[11]. Furthermore, Celsus, when he reviews the various principles and teachings of earlier physicians, has the following words to say: "If blood is transferred into those veins that are meant for the circulation of air and thereby starts the inflammation that the Greeks call φλεγμονην, then the inflammation itself causes such illness, that fever is present, as Erasistratus decided"[12]. Then Simson[13] issued a warning most salutary in medical practice: "Let doctors not be deceived, thinking that there is no inflammation if fever is not present, since inflammation often produces permanent diseases of the intestines and the stomach, even though no fever is to be observed when the pulse has been investigated"[14].

Arguments As To The Requirement Of Inflammation For The Making Of Pus

XVI. It will be obvious from what we have said above, that inflammation by changing the blood-vessels is a prerequisite of suppuration, and we have considered how, when swelling inclined to suppurate is lanced, before the inflammation has attained full development, not a bit of pus, but only unmixed blood, pours out. A second argument is that if the blood-vessels in the suppurating area cease to expel pus because of general physical weakness, such expulsion of pus does not begin again until the inflammation too begins again.

These facts no one but the distinguished De Haen denies. He, indeed, opposes this theory with what seems to me very insufficient reasoning. My plan now makes it imperative in the interest of fairness to present my argument against his opinion.

Contradicting De Haen

XVII. In the five medical histories described by De Haen as those in which pus flowed freely, he has this to say: "The general opinion is that pus originates in an inflammation that always precedes it. As a matter of fact, the inflammation is driven into the abscess, while the inflamed blood, stationary at the edges of the vessels yet pushed from behind, weakens the outer walls and, with them, is turned into a white paste. Therefore, in a long-lasting discharge of pus, there should be found an extensive loss of tissue. This is a fact established by many examples. However, these statements are not borne out by the medical stories quoted. In many of them there is no sign of preceding destruction of tissue"[15].

Objection Considered

XVIII. Now these individual histories show plainly the presence of inflammation, or else the recognized signs of preceding inflammation are obvious. Therefore, they rather contradict than support his theory as to inflammation.

So far as the preceding destruction of tissue goes, with that idea I have no quarrel.

HISTORY NUMBER ONE

This tells of a man who suffered from insanity. On the fourth day he developed a tetanus-like grin and on the fifth day he was dead. The whole diaphragm, almost up to the head, was not only inflamed but consequently gangrenous[16]. The great De Haen himself does not deny that, in this man's case, inflammation and pus production were companions.

HISTORY NUMBER TWO

In the cadaver of a seven-year-old girl, dead of pleurisy on the seventh day, he found a thick yellow crust that so stuck to the lung, pleura, throat, diaphragm, pericardium—that not a single area was free from it[17]. Pleurisy is an inflammatory disease, and it is not surprising to find in the cadaver a festering crust formed over the area covered by the inflammation.

HISTORY NUMBER THREE

This deals with a woman suffering from such tuberculosis as De Haen had not seen in twenty-two years. She expectorated quantities of sputum that was yellow, greenish, thick, abundant. It sank at once to the bottom of a bowl of salt water. In her cadaver he found the lungs not completely collapsed but, as it were, spongy, and, no matter how they were tested and dissected, they showed not a drop of pus, nor any trace of ulceration[18].

HISTORY NUMBER FOUR

This is the history of a man with dropsy, who had for a long time seemed tubercular and was very much flushed. From these diseases he eventually died. In his lungs, carefully examined for bits of crust, there were not the slightest traces of ulceration nor of pus. When the trachea was laid open, there was the same absence of pus as in the case of the woman in History Number Three[19].

These two are noteworthy illustrations of the departure of pus from the body and from any lurking-place where it might have been hidden. At the least, they show that no inflammation had preceded them, therefore they have no bearing on the subject at hand.

HISTORY NUMBER FIVE

De Haen presents another example. Here pus was shown to be expelled not only from the mouth, but also from the upper lobe of the right lung. This pus was copious and of long-standing, but had no visible source in the man's lung. In this patient there was a soft and changeable tumor on the right side of the sacrum. When this was opened, there emerged from it a thick and intensely yellow-colored pus. De Haen says that there was doubt as to whether this was due to the natural tendency of the lungs to ulcerate, thus ridding themselves of sputum and so being returned to their original condition, or whether, for some hidden reason that had caused the tumor in the beginning, the latter had dropped down to the region of the loins. On the fifth day after the tumor was opened, the man developed a second one on the upper right side of the thorax. Next day it disappeared and was followed by liquid diarrhea and sputum. The cause of this symptom, now clearer, should be referred to the pus-like tendency to ulcerate. On the eleventh day the tumor returned. When it was gently opened, bloody pus poured from it for four days. On the fifteenth day from the time the first opening was made, the man died. After death, a passageway appeared between the outside tumor and the right lobe of the lung, united with that area of the pleura into which the cavity penetrated. Otherwise, the lungs were completely free of any lesion. Therefore the cavity had passed through the eroded pleura into the actual tissue of the upper lobe, but the edges of the cavity in the lung had united so closely with the pleura by their own complete encirclement that the outer air could not enter the cavity at all, nor even penetrate the least bit into the hollow of the thorax. Moreover, the broken-down tissue of the lung showed the hollow pouch, there being neither side pouches nor ulcers to be found, not only there but throughout the rest of the lung[20].

The same story is to be told about the lurking-places of disease as in the preceding histories. I do not hesitate to say that, whatever was the remote cause of suppuration in the particular instance, the immediate cause in each of these histories was preceding inflammation, and De Haen has given no good reason for not ascribing to it the production of pus.

THE SIXTH HISTORY TO BE REFERRED TO THE PRECEDING FIVE

XIX. De Haen next recalls the case of a man who had suffered for some months from a severe cough. However, when his neck began to swell, the cough moderated. Indeed, it was scarcely audible. Then large tumors developed on the neck and upper chest. When they were laid open, partly by nature, partly by surgery, genuine pus, coagulated and abundant, poured out. Thereafter the man enjoyed the best of health[21].

Boils In Those Recovering From Smallpox, Etc.

XX. Later, he states according to the famous Mead: "There are sometimes boils to be found on patients recovering from small-

pox. They develop in a single day, increase in size, and, when lanced, pour out pus"[22]. This is not surprising, for these boils often show merely that there is absorption of pus into the blood, i.e., pus that has developed in internal areas. This pus finally works up to the outer surface of the skin until, a great deal having been collected, when the boil is laid open, it comes out on the same day.

Finally, one must admit that inflammation is regional. "When men in active practice have often mentioned the development of real pustules before any signs of fever, or at the time of the infection, or of the eruption, or even, sometimes, of its full development, or (they have said) how often they have seen pustules not only thrown out but fully developed without even slight accompanying fever, and real abundant pus originating in them"[23].

Why The Preceding Histories Do Not Disprove Inflammation

XXI. From an always careful consideration of these and similar histories and examples adduced by De Haen, unless I am much mistaken, there are present either obvious signs of inflammation or those less obvious but sufficiently evident to be noticed. Absence of pain is not enough to negate the presence of inflammation, nor is the pulse-rate, when not faster than in healthy individuals, for all parts of the body do not feel the same amount of pain under the same circumstances. Some parts feel no pain at all except in serious illness. The lungs in particular seem to lack feeling as do some other inner functional organs. Among different individuals the strength and speed of the pulse vary considerably; with an identical count, one may be perfectly well, another burning with fever. Neither the sensation nor the degree of fever is always the same in a given area, as the learned De Haen himself admits, for, not only did he remark on it, but says in plain words "there are local fevers, so that a feverish pulse may be present in the affected part only, but perfectly normal in the rest of the body"[24].

Inflammation Discussed

XXII. In view of all the foregoing, inflammation seems to creep in unnoticed, so that it can be scarcely felt by the patient or observed by the doctor. Thus there is no reason why the doctor, who is often summoned too late, should at once be aware of a preceding inflammation, nor that he should notice its beginning and progress. For, when pus has been formed, all symptoms improve and patients often forget preceding symptoms—so that the belief in their presence is either very slight or entirely lacking. Thus it may be concluded that inflammation always precedes the building up of pus.

Changes Undergone By Blood-Vessels Emitting Pus Prior To Inflammation

XXIII. The great Boerhaave has beautifully described the changes suffered earlier by the blood-vessels in injured areas (and) how they are adapted to their function of making pus: "The tissues forcibly withdraw more and more from each other. The edges of the wound begin to redden, to grow hot, to ache, to swell, to be turned backwards. At the same time there is present a slight temperature accompanied by thirst and heat. Next, on the third or fourth day, sooner or later, there appears in the wound a sticky, white, fatty, homogenous fluid—pus. At the same time, the redness, the heat, the pain, the swelling, the reversal of edges, the traces of fever all disappear or are, at least, lessened"[25].

Symptoms of inflammation on the way to becoming an abscess and very like the above have been carefully and eloquently reviewed by Celsus: "While the situation is maturing there is, as it were, greater activity on the part of the veins along with heaviness, burning, distention, pain, redness and hardness, although a large abscess, tumor, and even feverishness, remain. When these symptoms have improved, and the spot is already festering, either it is rather white-looking, or else full suppuration is present"[26].

The Substance Of Pus

XXIV. If one asks about the substance of pus, what part of the blood furnishes it, is its origin not from the blood and where does it become mixed with it, I reply, by guess only, that it comes most likely from a mixed blood. Perhaps, however, the viscous element of it is the more abundant, and forms its characteristic element—this the great Senac calls lymph-coagulant[27]. The theory presenting the nearest likelihood to truth is that pus is a fluid affording a nutriment that restores the future losses of solid tissues. This theory seems to be backed by the obvious analogy of the qualities that it possesses in common with the white of an egg, and the theory, so far as it is known, of the nourishment of the chick within the egg. This argument does much to establish the former theory concerning the extreme wasting away of the body, which pus, pouring out in great quantities, very often closely follows. While only slightly poisonous fluids are present, the blood is starved except for such nourishment as comes from too great an accumulation of pus. This statement is made by writers who are in medical practice.

Effects Produced by Changes in the Blood-Vessels

XXV. If what I have tried to show from VII to XXII, i.e., that, in all suppuration, inflammation precedes the secretion of pus and that, as we have seen in XXIII, the condition of the blood-vessels is always changed thereby, what is there left to show except that the individual changes in the blood-vessels, in the fluids passing through them, or caused by their secretions, effect other characteristics corresponding to these very changes? I shall approach the proof of this theory under the following three sub-headings:

1) From the secretion of fluids in the living body.

2) From the general secretion of fluids in plants.

3) From certain disorders both of living beings and of plants.

CHAPTER III

SECRETIONS OF FLUIDS IN THE LIVING BODY

Different Types of Secretion

XXVI. The commonest type of secretion in the living body is the movement of fluids away from the arterioles of the small glands, and these arterioles, dividing into many branches, mingle together again as they meet in the larger main channels.

Through Small Glands

Now a different kind of secretion occurs when the blood-vessels, separating (other) fluids from blood, expel them from separate openings away from the interference of the glands.

And from the Glandular Structure

Examples of such are to be found in the fluids discharged by the eyes, in various extremely thin fluids, e.g., those coming through the pores of the skin, and through the small vessels of the villous lining of the intestines and stomach. We have the very same phenomenon in the eruption of pus. The questions now arising must be carefully examined: the preparatory cause of the flow, the condition of the secreting vessels, and the changes that affect the fluids after secretion.

The Causes Preparatory to Natural Secretion Relation of Branches to Trunks

XXVII. It has been proven from observation and from reasoning that various fluids are separated from the blood just as there is a larger or smaller relation of branches to trunks. Thus, in their lumens, when the difference in size of blood-vessels is considerable, a thinner fluid is transmitted, through the branches. When the difference is less, then the secreted fluid will be most like the source whence it arose. The greater quantity of fluid flowing will be in proportion to that already gone. On these two phenomena largely depend both the quantity and the consistency of pus. We see this to be true both in openings made by

surgery and in those present in many chronic ulcers that, turning, so to speak, into little fountains, pour out an almost incredible amount of pus. As we have noted in XXIV, this happens to patients wasting away with marasmus, when no poison is present in the blood fluids, except that the body is too weakened by lack of nourishment due to the building up of pus. Thus for a long-lasting secretion in the trauma, the lumens of the blood vessels pour out a greater quantity of pus, and the continuation of the conditions is lengthened. Moreover, throughout the various stages, the blood fluids are secreted, although their qualities may vary, since, as we may suspect, their elements differ, at least in proportion to their quantity.

System of Junction between Branches and Trunks

XXVIII. The junctions that the branches make with the trunks doubtless differ in the same way as the fluids destined to enter them. This condition applies also to the manifold twistings, intertwinings, and anastomoses of the blood-vessels. The great Ruysch shows very eloquently that the individual organs are appropriate to their special secretions, and have their own channels differing from all others in both direction and distribution. He says: "How incredible are the variations to be seen in these, in those, and in still others. Of a truth, everywhere one finds another and entirely different arrangement, and this difference is practically essential, because they must all, individually, form, each in its own way, what amounts to part of the living body, while they are due to produce so many different fluids from the blood, or from its serum, or from chylo-serous liquid"[28]. Where there are numerous anastomoses, the individuals meet in turn, going in their various directions with an energy sufficient to make them thinner. Meanwhile, the short, straight blood vessels produce a thicker, and perhaps, more abundant, secretion. The consistency of the fluid from which it is derived may also, perhaps, contribute to this end.

It is unnecessary to dwell longer on preparatory circumstances, since what they do in the case of natural secretions, may, perhaps, apply less to the production of pus, because the latter is only a replacement and so needs no preparation.

Size of Blood-Vessels is Primary Characteristic

XXIX. In every secretion of living fluids, among the primary characteristics from which arise not only the fluidity, but also the manifold stages of dependent types, the one point on which there is the least argument is the variety of the vessels' cavities and openings suitable for the reception of small masses. Thus the individual secretions depend on the exact plan of the vessels' formation, so that their make-up be wasted as little as possible by either increase or decrease, and thus may their fluids be clear or tinted, thicker or thinner. So, if a major change occurs, something completely different may develop. Hence, is it not probable that, because of differing blood-vessel conditions, when inflammation has crept unnoticed into some area, the smallest lumps should now suit certain vessels that, in a previous healthy state, were not exactly suited to receiving any secretion? Further, in this healthy state, is it not probable that some particles, divided differently, should not be eliminated through the pores, having performed their function, or that they should have returned with the restoration of circulation, so that they would have made the rounds again and would have been further eliminated? In these inflamed blood-vessels, the small lumps, of whatever material made, can be broken down or built up by the influence of the blood-vessels and of their circulation. The blood-vessels themselves can undergo such transformation as may be most suitable to their required function. Again we come back to the same question, i.e., whether on the one hand, we think pus originates in the lumen through the infinitesimal branchings of the circulatory system, and, because the vessel walls are too thick to admit any more red drops, or whether, on the other hand, we think that pus develops from some

small serum-carrying or fat-bearing vessels, or from others appropriate in various ways to its emission.

Irritant Power in the Secretory Organ

XXX. Here, again, it must be stated that any irritant force in the secreting organ very often hastens expulsion, speeding up and increasing the secretion to a surprising degree. Thus milk, which would otherwise remain motionless, flows from the breast when the nipple is stimulated. As a matter of fact, a secretion of this sort sometimes occurs in the case of a virgin, or even in that of a male, otherwise not intended to give milk[29]. When the hungry catch sight of food, saliva often floods the mouth in considerable quantity. In erotic dreams, that are due to a lustful mind, from the stimulation of the seminal fluid in the testicles, as they swell, the fluid is thrown forward by the violence of the orgasm. This happens often in the experience of the most chaste of men. Similarly, hot bits of tear-fluid, lying hid, pour out their secretion at the smell of paint in such a way that the salt water is not strong enough to activate the reabsorbing ducts, and the tears immediately pour down the cheeks[30]. The great Haller, who deserves to be consulted, has offered numerous other examples in "Reasons for the Variety of Fluids", where he has discussed these matters eloquently and at greater length[31].

Bits of Tissue Proportionate to the Lumens

XXXI. The blood-vessels having the larger openings for secretions keep separate the thicker and stickier fluid, while, from the smaller openings, the issue is thinner and more liquid. Reason shows why the thicker fluids should enter the smaller openings either with more difficulty or not at all. Furthermore, as I have stated in XXIX regarding the lumens of the blood-vessels, they correspond to the size of the little tissue-masses, one of the main reasons being that the secreted fluids vary considerably in character. The same statement can be justly made of the receiving openings and of the forwarding outlets.

Tension of Blood-Vessels

XXXII. The tension in the blood-vessels is the same for all, all essential to the secreting of healthy fluids. This tension always depends on the proper preservation of the life-force, i.e., in its not becoming too greatly strained. Without such a proper balance it is, on the one hand, unavoidable that the circulation be interrupted by too great an elasticity of the vessels, as they then fail to cause the proper type of secretions; on the other hand, with too much tension, either the vessels, by stretching freely, would lose their individual secretions, or the even flow of fluid requisite to natural secretion would be thrown into confusion.

Speed of Circulation

XXXIII. Then, too, the rate of fluid-circulation, creates certain special conditions, at least it is meant to do so. Everyone knows that the circulation is maintained at a proper speed and that, if the rate is slowed up, or entirely stopped, the blood becomes thicker. The thinnest fluids, where there are overlying muscles, are, for the most part, distinguishable, e.g., saliva and gastric juice. If a man with an ulcerated leg moves hither and thither too much, a greater abundance of pus pours out and is considerably thinned. When the temperature is elevated and the body fluids are subjected to festering, as is visible in a hectic flush, thinner pus pours out, not only because of the festering that tends to thin fluids, but also because of a too feverish, therefore too rapid, circulation.

Effect of Differing Degree of Openings

XXXIV. I do not lay too great stress on the varying conditions of the blood-vessels. For, however different may appear the consistency, color, odor and all characteristics of urine secreted from the same blood, the mouths of the urinary vessels may undergo a sudden

change in a short time, when some abdominal seizure occurs, or when fright strikes a person unexpectedly. Normal urine is clear, odorless and weak because of the contraction of the small openings, the latter is orange-colored, or of a yellowish tinge, caused by the spasm of the openings. Do not the restricted openings, inasmuch as they are narrower, pass along the thinner fluids, and similarly the urine, that was recently like that of healthy individuals, now clear and colorless? By increased circulation and pressure through the kidneys, blood itself is sometimes expelled. Haller says: "The urinary tubes can be so changed that urine now lighter, now heavier, than water, even black, also fluids of different types, may enter the renal passages"[32]. Thus do other secretions vary, in so far as the blood vessels are more stretched or more constricted. Also it very often happens in catarrh, diarrhea, diabetes, and in the expectoration of saliva, whether the excretion be natural, artificial or diseased. We see the same thing happening in the secretion of pus, according to the various degrees of the trauma.

Blood-Vessels Allow Some Diversity

XXXV. Now the outlets of the blood-vessels can undergo certain changes of shape, size and type of opening. Nevertheless, they excrete fluids of the same sort, but, in every variation of the secreting vessels, there is some difference in color and consistency. Hence, although the secreting vessels may suffer minor changes, the character of the fluid secreted is not innately changed. When, moreover, the vessels are much altered, then a different serum is secreted throughout, as we shall see when we come to the changes that diseases produce.

Changes Affecting Fluids after Secretion

XXXVI. The common causes that can change fluids after secretion are: Time, Temperature, Absorption.

Time

XXXVII. When the fluids lie still and time passes, then bits of tissue of similar character are drawn together by strong mutual attraction and push out the thinner materials. Hitherto, because of their forward movement and through the causative action of the blood-vessels, these materials being carried along by circulation were, so to speak, held apart from one another. The separation so caused brings them greater viscosity, and the small tissue-lumps adopt a more homogenous appearance.

Temperature

XXXVIII. Heat is thinning and causes a scattering in the fluids exposed to the air. It also promotes absorption and creates different degrees of viscosity, making a stronger union of the tenacious elements that are to be found in our body fluids. If, indeed, the temperature be much elevated, it starts an intestinal movement of tissue-particles and causes festering which sends out the most viscous fluids to an extreme degree.

Absorption

XXXIX. No one today denies that the blood-vessels permeating the entire surface of the body open into all its hollow parts, which enjoy the advantage of receiving the more changeable fluids adjacent to them and of carrying them into the blood. Long ago the highly respected Glisson[33] merely guessed at this: that the small mouths of the lymphatics open into the cells of fat through which their fluid and the fat itself might be cleared into the blood. In the few years since his time this has been demonstrated by the labor and skill of the most outstanding anatomists. It has been confirmed, too, both by the most exacting experiments, coupled with thorough observations, and by the phenomena of disease. These facts we learn by what has been done by the distinguished Professor of Anatomy Monro, Jr.,[34] and from what the widely-known W. and J. Hunter have done in the public interest[35].

Hence we know that the thinner part of any fluid, whether it be moving by secretion or

excretion, can be reabsorbed into the blood, and from the blood into the natural cavities of the body or of its organs, or into fatty tissue; or whether it is being scattered about outside of the blood vessels, since there is always present an abundance of diluting water, upon the removal of which it (the aforesaid fluid) becomes too thick.

Different Look of Certain Fluids from that of the Ones Reviewed

XL. Here it is as well to present certain types of fluid that adopt an appearance different from that of the types reviewed above.

At the beginning of catarrhal inflammation, the mucus, pouring down in quantity now and again from the pituitary membrane, having not the time to thicken, drips from the nostrils in a thin stream. Next, as the quantity diminishes and is retained at night, it grows thick so that, when exposed to the air, by natural action and in warm surroundings, the more fluid part being gone, it is formed into a hard crust. A fatty liquid that flows from the eyes of the partially blind hardens in time into a firmly set rheum. The wax secreted in the outer opening of the ear is likewise thin at first, presenting the appearance of olive oil. Later, however, with time, warmth and exposure to the air, it begins to thicken, becomes much more adherent, and changes its color, mainly into yellow. In this kind of situation, air doubtless functions as a vehicle, by carrying away what warmth makes volatile. Now when the moisture secreted in air is not apparent and the liquid cannot be dissipated by it, (since it is held in an enclosed space) the absorption of the fluid element serves the same purpose. Thus fat, which, when soft and fluid, is separated into small pouch-like forms, with the passage of time, and perhaps with the absorption of the thinner parts, grows into a thick mass, and this mass becomes stronger and more permanent upon mere contact with cold. Thin liver-bile, after re-absorption into the gall-bladder, becomes less fluid and more bitter. The sperm, that seems to be carried away from the testicles in a thin stream, tends to become sticky and viscous when reabsorbed into the blood in the female organs.

Bile and Sperm

It is worth while to note that these two last-mentioned grow thick in receptacles far away from their secretory organs. In the same way, pus is secreted as a thin fluid, but, for the same reasons, acquires a certain amount of viscosity.

Wherein The Preceding Facts Favor My Theory

XLI. The examples above favor my theories wherein I argue that pus poured from the openings of the blood vessels is changed by inflammation, so that it is expelled as *pus*, and that it does not need a resting time before earning that name. For the rest of the fluids already discussed—mucus, rheum, wax, fat, bile, sperm—these terms are assigned to them in the first stages of their separation from the blood, they still retain them after having suffered the passage of time and the warmth of their surroundings, also the dispersal and the absorption of their thinnest parts. Does not the production of pus, do not the changes that it suffers, appear to be the same as these others? Their nature, a thin fluid secreted from the blood, thickens outside the blood-vessels and, similarly, is hardly changed at all, except in respect to color and consistency, along with the characteristics dependent on these two.

True Nature of Pus

XLII. It is true that pus can acquire from ulceration certain qualities different from those it now has. From its own nature and from circumstances caused by the passing of time, pus becomes ulcerous more quickly and to a greater degree than does any other body fluid. Moreoever, it is not changed at all, as are almost all the other fluids to some degree at least.

CHAPTER IV

Concerning Plant Secretions

Causes of Plant Secretions

XLIII. If the secretions of living fluids throw any light on the production of pus, I think that those taking place in the plant world explain this theory even more clearly.

Among the plants are found no heart and no blood-vessels consisting of elastic membrane, to force their fluids through their varied tissue of their different secretions, with the same vigor as they do through the living body. Here is found a different kind of fluid motion and different kinds of power are to be looked for. Plants draw their nourishment from the soil with the aid of outside tubules that constitute the stalks of the root. The roots, growing together, form the trunk into which the lengthened vessels next carry the nourishment. There the nutritive saps, ascending through the trunk, are distributed through the various branches, branchlets and leaves, through the stems, flowers and fruit. The leaves greatly increase the surface exposed to the outer air. Furthermore, the surrounding atmosphere, acting, perhaps, as a solvent, serves to carry away the material that the plants are constantly exhaling through this increased surface. The learned and brilliant Reverend Dr. S. Hales has explained this operation in excellent fashion[36].

Contractive and Selective Ability of Stalks in Motion

XLIV. Is it to release the circulation of the sap in plants that a sort of contractive energy is applied to the moving stalks where the vessels exist in different plants and vary in different parts of the same plant? Or, does warm air cause what we observe in spring, i.e., that sap should flow naturally? Or, is there really a kind of non-liquid selective power? It seems to me most likely, however, that all these qualities exist simultaneously. Although similar in these respects, there is nothing common to both animal and plant life. Because, however, there is a striking analogy between the fleshy structure of the latter and the cellular tissue of the former, the blood circulation of living beings may well be compared with the sap-carrying vessels of plants. The famous Ruysch[37], who outstripped nearly all of his contemporaries in his skill at finding, observing and explaining the tiniest vessels in both groups, says that the particular areas of the living body intended to secrete a certain sort of fluid have canals entirely different from all the others. So, just as there is a great variation among the blood-carrying vessels of the living body, the same statement can be made, and with equal justice, of the plant's sap-vessels. They have their most remote tubules adapted to their function in accordance with the laws laid upon them by their Creator, with their own potentiality present in their seed.

Analogy between Plant and Animal Secretions

XLV. In the following instances there seems to be a striking similarity, between the secretions to be found in both the plant and the animal kingdoms. In both, at any rate, the secreting vessel requires a special material wherever different secretions are being prepared[38]. In both, the fluids are equally changed by similar circumstances, such as the size of the vessels, anastomoses, and harmonizing intricacies and openings[39]. To these phenomena add the circulation of the fluids so influenced, the dispersal through side channels of the thinner element, and thus specific proportion of the fluid components. As all these phenomena vary in different proportions, innumerable affinities spring from them. Hence comes the great difference between plant-saps and living fluids. How otherwise explain the infinite number of saps of such different kinds that occur, some in some parts, some in other parts, of the same plant—as, for instance in the roots, stalk, bark, pulp, sprout, fruit, leaves? How explain the perfected growth to which different plants come in the same soil, the sweet and the sour, the

healthful and the harmful? Why, too, the differences in saps, extremely sweet in the case of sugar-cane, extremely bitter in the case of the purgative pumpkin-seed? Yet these are plants grown in the same soil, even in the same container, exposed to the same chances of weather, enjoying equally shadow and light, rain and heat.

If there is such a close connection between the appearances and characteristics of fluids and the state of the vessels through which they pass, and if not only the blood-vessels of living beings, but also the circulation through them, are always changed by inflammation before pus is formed, as I now believe to be self-evident, then there is nothing to contradict the assumption that the formation of pus is caused by all these changes. If anything more seems necessary to clarify this theory, I shall attempt to present it in the next chapter.

CHAPTER V

Certain Diseases of Both Animate and Inanimate Beings

Production of Callus

XLVI. Callus is an odd fluid, shed from the openings of the blood-vessels when bones are broken. However, we have never heard that it, or anything like it, is found in the blood, or in the genuine blood-vessels of healthy living beings, nor has it, rather than genuine pus, been discovered there by any experiments. We know that when a living creature has obtained full growth, no bone-fluid is ever produced except in the case of certain accidents, e.g., fracture, contusion and inflammation. The formation of callus always follows such occurrences. It is often possible to notice, not only in full-grown individuals, but also in those far advanced in years, that the blood vessels which before used to supply bony tissue during the youth of the creature, have long ago stopped making that contribution. When they have fulfilled the conditions under which bony tissue is usually increased, by renewing the secretory state of the blood vessels, the latter begin again to produce callus in great quantity. The same thing happens whether we think it is begun in the blood vessels of the periosteum (as the great Du Hamel[40] thinks), or whether we assume that it issues from the actual tissue of the bone itself. We, like others, think the latter the more reasonable.

Diseased Secretions in the Living Body

XLVII. Something foreign is immediately secreted from the bile out of a blocked and hard liver on account of the changed conditions of the blood-vessels. Furthermore, and this strengthens my view, frequently most areas of the human body are supposed to secrete nothing when healthy, yet we see the situation so changed in time of disease that different, i.e., various, substances are generated by the blood-vessels, such as were never before noticed in the body. Our own great Professor Whytt has presented a great many examples of this change in his lectures. The growth of this new substance is found in badly diseased ovaries and in other organs of the human body where the tissue has been much altered by disease. Furthermore, the lumpier parts that exude a naturally mild fluid, when they are unfortunately bruised, the fluid from the altered blood-vessels then being carried away, they secrete a fluid totally different from that of health, a fluid that is often so acrid that it destroys the nearby areas with which it comes into contact. We have received a remarkable illustration of this process from the well-known Baron Van Swieten. Speaking of an enormous canker he says[41]: "Now it seems that fluid carried to the lesion deteriorates at that very spot, and, although previously benign, there acquires a malignant quality. For I have seen, in an otherwise healthy woman, a suppurated canker exuding such a malignant poison as had not been present in the blood before but had been generated at the lesion." Aetius, too, speaking of suppurated cankers, said this: "It throws off bloody matter more loathsome both in quantity and odor than any from a wild animal. So the blood-vessels of each body area, brought to this condition by a trauma, contain fluids that, previously perfectly

healthy, seem capable of secreting a destructive discharge" [42].

Plant Diseases, Grafts, Etc.

XLVIII. Plants, injured or bruised, acquire a vessel structure different from that of their neighbors, as we see in their excrescences that grow and harden. These growths draw nutriment and nutrient sap from the plants by way of their vessels changed into a substance peculiar to each, (but) they change less than if this growth were a normal part of the plant. The branch of a tree bearing one kind of fruit adopts and feeds the foreign branchlet of a different kind inserted by grafting.

Parasitic Plants

XLIX. We have a similar story to tell in connection with parasitic plants, even if they develop on other growths as in the case of the mistletoe on the oak and some other trees. For it grows on many trees and always exhibits the same strength in each case, nor can the mistletoe from one tree be perceptibly distinguished from that grown on another. These facts show that the substance of plant parts, their formation and their strength, depend not only on the nourishment drawn from their sap, but also, and especially, on the particular structure of their vessel-tissues.

Cock's Spur

We are told that the cock's spurs situated on his comb unite with it through inflammation and grow together in that manner. If I am not mistaken, this account is given in *Mémoires de l'Académie Royale* by M. Du Hamel.

All these and many other examples that would take too long to present now, are arguments that a new secretion is always made when significant changes take place in the blood-vessels, and they prove that the origin of pus is merely that of a particular fluid endowed with its own characteristics and dependent on the same kind of circumstances.

Traumas in the Living Body

L. It is very remarkable that if ever the accidents mentioned occur in any part of the body, pus is formed, the blood-vessels being turned, as it were, into a secretory organ. Thus the human body can be loosely compared with a certain type of fern that, when torn or cut in any of its parts, displays whole uninjured parts sprouting anew from its own resources. Hence there is a better outlook for the body than if an edema had developed, for in every part of the body subject to trauma there would have been pus-producing swellings added to others of the same sort, and so on ad infinitum.

Objection Considered

LI. Against my theory that pus is a secreted fluid, there is no valid objection, because there is no indication that pus is already in the blood, and because it may not be concluded with certainty that it—pus—can be developed from some special material commonly regarded as foreign or from a mass of blood. For the same fact is equally true of saliva, gastric juice, mucus, bile, pancreatic juice and many other fluids, found separate from the blood itself. Their production is not to be referred to simple filtration nor to mechanical mixture.

Answer To Objection

LII. I do not take it upon myself to explain either what connection there is among the particular phenomena that we see in individual secretions, and the conditions of the blood-vessels on which these secretions depend. For, although I may be sure of a truth and may know that it stems from certain peculiar conditions, nevertheless, it is not in my province to explain such and such conditions produce such and such results. The effects are obvious although the influences behind them lie hidden. I am satisfied to have presented peculiar conditions which, when present, either persist or disappear. Their result, the making of pus, persists or ceases, and as the given conditions change, the pus too changes in proportion to them.

The Secretions Of Different Fluids Stem From Like Causes

LIII. As soon as we fully understand some

one of the glandular secretions, it seems to me highly probable that we shall understand the secretion of every other fluid. We shall realize, too, that the source of pus is the same as that of the others, because all, in my opinion at any rate, arise from similar causes. Since the formation of pus differs so strikingly from the building up of glandular fluids, it is undoubtedly necessary for it always to be present to feed the body and support life. For this reason, as organs are required that are adapted to their purpose as being always essential, so we see them formed as congenital with the body. Moreover, we rarely find lacking that which is required in certain diseased conditions, so, unless under unusual circumstances, nature, economical of effort, by God's Will, accomplishing nothing vain or superfluous, so much the more wisely treats the conditions of the blood-vessels, and of their circulating fluids, changed then and there, according to circumstances, when and where necessary. I have been struck dumb with admiration while contemplating the wisdom and mercy of the Supreme Being here demonstrated, a Being Who has so formed the living body that injuries and inflammations, struggling towards an outlet, should make changes in the illness itself capable of effecting the cure through its own power. Just so does a poisonous snake, that threatens death with its fang, offer an antidote to its bite with its own fat.

Consequence Of The Preceding

LIV. As I have explained, although not completely and in detail, how pus is produced, and have not clarified the individual laws affecting its secretion, nevertheless I trust that I have made clear the more essential facts and those that generally hold true. I hope, too, that I have illustrated my proposition by reasoned arguments as well as by suitable examples, to an extent sufficient to establish my thesis, so that, after a thorough investigation of every detail and having expended sufficient time, I shall judge that proposition (which I was to prove) to have been duly established. The proposition is: That the production of pus, much like a secretion, is necessary to the organization of the living being, or, more literally, it is the secretion of a special fluid of a living being, formed, by an innate ability of the blood-vessels suited to the purpose, from the appropriate stage of a preceding inflammation.

The origin and production of pus having been thus explained, it is well to gather together some of its corollaries.

CHAPTER VI

Some Characteristics Resulting From the Foregoing

Loss Of Tissue

LV. While little or none of the actual tissue is lost, an enormous quantity of pus can issue day by day from ulcers. Some have wondered how pus seems to consist of solids dissolved and mixed with fluids. To quote Aretaeus: "It is indeed a strange fact that, from the weak, thin membrane enclosing the ribs and having no thickness at all, there should emerge such an abundance of pus, for we understand that, in many instances, a great quantity of it has been collected"[43]. Now, when we consider pus as a secretion there is no cause for surprise, since the difficulties of explaining its manufacture are minimized.

Imitation Of Pus

LVI. There is no artificial imitation that, in all its qualities and innate character, exactly resembles pus itself. So man's toil can by no means imitate the blood from which pus is produced, for it can be developed only in the living organism of the body. Now an imitation of pus might be looked for if pus were a fluid originating outside the blood-vessels, as the great Baron Van Swieten said, from a mixture of the supposedly developmental elements, and if, to these elements, could be added the degrees of heat thought necessary to their union, and if, at the same time, the less substantial part were carried away by evaporation. Then there would be

present the perceptible qualities and characteristics of pus, indistinguishable from the true pus of a trauma. All these things can be done and have been done by a variety of experiments, but true pus has never resulted from them. For the exact reproduction of color alone, or of consistency, is not sufficient proof that any two fluids are of the same nature.

Suppuration Is By No Means Always Present

LVII. There is no universal suppuration. For this procedure of suppuration from the openings of the blood vessels and from tension, and from the movement of fluids through the vessels—these depend entirely on the life-force.

A secondary development of pus is caused by the state of the vessels, by the action of drugs, or by changes in the life-force, although Grashuis presents a clever counter-argument when he says: "The effects of drugs on the blood-vessels and on the fluids flowing through them are of little importance, because the making of pus takes place outside of the vessels" [44].

Pus Propulsion

LVIII. We learn how motion drives pus forward and when the different kinds are indicated.

Since it has been shown above that suppuration always depends on the right stage of inflammation, and this again, always on the stretching quality of the solids and the forward drive of the fluids, then the following facts are clear:

1. That in ulcers of a malignant type, when the diseased parts are the least relaxed, the drugs that increase the elasticity and the strength of the blood-vessels, some stimulating, some strengthening, some tightening—these drugs best promote the work of suppuration. From this fundamental fact can apparently be deduced the effect of the much sought after Peruvian bark, as well as preparations derived from metals, e.g., copper, iron, mercury and the like.

2. When there is present great tension, violent pain and a spasmodic contraction of the blood-vessels, then relaxants are most beneficial. Let us apply them to the affected parts, the oily and the glutinous drugs mixed with water or the like, no matter what name they may enjoy, or in what form they are used, whether we call them relaxant, digestive or emollient, or whether we use them in the form of a fomentation or of a poultice, of a liniment or of an ointment.

3. If the driving power of the fluids becomes less than normal and suppuration is therefore stopped at the wrong time, in order for it to proceed, one must induce fever again and produce the suitable inflammation. Thus we know why and how drugs used for this purpose are often of supreme importance.

4. If, however, the life-power is too strong and the drive of the blood-vessels becomes greater than normal, then the best way to obtain suppuration is the letting of blood and lessening of the circulation. If these measures are omitted, gangrene and necrosis of tissue follow swiftly.

Action Of The Blood Vessels

LIX. Changes in fluids, while they are being secreted, are due less to the affected vessels than to the forces impelling them to change. So no power of making laudable pus is to be sought in drugs from their mixture with living fluids, nor are we to attribute to any such power the characteristics of pus.

The sap-bearing tubules of a flourishing and vigorous tree draw their fluids from the earth and change them into seeds, flowers and fruit. When, moreover, the tree, its roots torn out, lies prone on the ground, then it withers, and loses all its ability to absorb the nourishing saps, because the activating force of its vessels has been broken up and lost. The procedures that are commonly said to promote the making of pus do not, in fact, produce it, but so scatter the affected areas that they do not deteriorate, nay, rather, for this very reason, they manage to produce pus the more quickly [45]. Shortly before death ulcers excrete too

little pus, not because it is locally accumulated at this time, but because the blood-vessels are not in the condition essential to excretion. For the vital force weakens and we know that we must sustain it to some degree at least in order to make the secretions of health entirely normal.

Differing Aspects Of Pus

LX. According to the appearance of pus, which may vary at numerous stages—the appearance of the color, the consistency, the acidity, or the alkalinity, it is easy to recognize from the aforesaid certain accidental phenomena.

The circumstances of the secreting blood-vessels and of the very fluid they hold can be affected by all that is abnormal, chiefly by the food and drink of the patient, by drugs and by the general condition of the body—in other respects, either well or ill. Furthermore, according to the increased or diminished proportion of elements in the blood, according to the liquidity or viscosity in the type of secretions, according to the degree of inflammation and to the area affected, and, besides these conditions, according to the length of time passing after the secretion, as the temperature is more or less elevated, also according to the greater or smaller absorption of the watery element, in consideration of all these conditions, not only the outward appearance of the pus, but also its innate characteristics vary to a certain degree. These differences are increased in so far as more or fewer of the aforesaid phenomena occur. Hence comes the different look of pus in suppuration of the kidneys, of the liver, of the spleen, of the parotid glands, or of the salivary glands, of the fat, of the muscular, or of the membranous, parts of a sturdy body, or the appearance of the pus in a person in whom the blood and all the fluids are poisoned by disease showing scrofulous or tubercular symptoms. Hence all the different kinds of pus cannot be included in a few terms, because the various types that must be distinguished one from another have not ye all been thoroughly studied.

To quote Horace: "So far and no further.'

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Presidential Address: The College of Physicians of Philadelphia[1]

By JOHN H. GIBBON, JR., M.D., SC.D. (HON.)

LADIES AND GENTLEMEN: It is my privilege and pleasure to make a report to you of the past year's activities of the College, as required by the By-Laws and Rules of the College. This report will be concerned largely with financial matters, as these seemed very pressing when I took office a year ago. As perhaps you share my confusion when presented with a mass of figures, I shall try to keep my discussion simple and avoid distracting detail.

Dues

I would, first of all, like to review where we stood last January. Because of an operating deficit during the past fiscal year of some $17,000.00, the Council of the College recommended with great reluctance, in December 1963, an increase in the dues of Resident Members from $60.00 to $90.00 a year. This recommendation was balloted upon by the membership and was adopted at the February 5, 1964, meeting retroactive to January 1, 1964. This increase in dues was an essential step toward putting the financial affairs of the College in order so that the College and its Library could continue to fulfill its functions in the community.

The Fellows

Now a word as to our Fellows. On January 1, 1964, we had 1,091 Resident Fellows and 138 Non-Resident Fellows, or a total of 1,229 Fellows. I have omitted from this total our Honorary Fellows and our Honorary Associates. On January 1, 1965, there were 1,085 Resident Fellows and 153 Non-Resident Fellows, for a total of 1,238. Fifty-eight Resident and 14 Non-Resident Fellows have Life Memberships and are not required to pay dues, and the dues of 54 Resident and nine Non-Resident Fellows have been remitted by Council, usually for reasons of health. This leaves 973 Resident Fellows and 130 Non-Resident Fellows who pay dues as of January 1, 1965. With the former dues of $60.00 a year for Resident Fellows, the total income from dues of Fellows would amount to roughly $60,000.00 a year. With the new dues for Resident Fellows, the total income will be roughly $90,000.00 a year. Thus our income has been increased by $30,000.00 a year.

Reinvestment of Securities

Under the vigorous leadership of Dr. Harold G. Scheie, Chairman of the Finance Commit-

[1] Annual Report of the President, The College of Physicians of Philadelphia, 5 January 1965.

tee, much has been done during the past year to improve our financial condition. At the suggestion of Dr. George I. Blumstein, the Finance Committee met with Mr. John P. Chase of Boston, who gave the Committee much valuable advice at no cost to the College of Physicians. These suggestions were then turned over to Mr. James E. Osmon, of the First Pennsylvania Company, which is our financial advisor. Mr. Osmon reviewed these suggestions and came up with his own list of suggested changes in our portfolio. He recommended the sale of certain bonds, preferred stocks and common stocks of low yields. These amounted in value to about $650,000.00. This sum he recommended reinvesting in securities of higher annual yield. These recommendations were agreed to by the Finance Committee subject to the approval of one of our Advisors, Mr. Edward Hopkinson, of Drexel and Company. Mr. Hopkinson approved Mr. Osmon's suggestions and these financial transactions have now taken place. These changes in our portfolio should result in an increase in our annual income of something over $17,000.00.

The Fiscal Year and the Budget

There seemed to be little rhyme or reason in having the fiscal year of the college run from November 11 to November 10 as it had in the past. The Finance Committee recommended, and the Council approved, changing the fiscal year so that it now runs from July 1 to June 30. This change was made during the past year so that we are currently in the first full new fiscal year running from July 1, 1964, to June 30, 1965.

The budgets for the various committees of the College in the past had been drawn up and presented to the Finance Committee after the start of the fiscal year. The Finance Committee recommended, and Council approved, that these budgets be presented to the Finance Committee and then to the Council *before* the start of each new fiscal year.

Pensions

During his last year in office as President of the College, Dr. Durant appointed a special committee of the College consisting of Kendall A. Elsom, T. Grier Miller and George I. Blumstein, Chairman, to study the possibility of improving the pension plan for the employees of the College which had been adopted in 1949. As this Committee had not completed its work when I took office a year ago, I reappointed the same committee. The committee, under the able leadership of Dr. Blumstein, presented its findings and recommendations to the Finance Committee for implementation in the spring of 1964. Through the good offices of Mr. Diemand, an Advisor of the College and then Chairman of the Board of the Insurance Company of North America, a suitable retirement plan was drawn up for all the staff and employees of the College of Physicians. The plan will be operated by the Insurance Company of North America. Past funding by the College of Physicians for retirement had been quite inadequate. Only $18,000.00 has been set aside, whereas approximately $42,000.00 should have been set aside. Provision is now being made in the annual budget of the College for making up this deficit, so that in ten years or less, the $24,000.00 which the pension fund is shy will be restored. This new pension plan went into effect July 1, 1964. In addition to providing pensions for all the staff and employees of the College, everyone employed by the College now has his life insured for $2,000.00. The cost of this life insurance is also borne by the College.

The Erlanger Garage

This garage was purchased by the College in 1957 principally to ensure that parking facilities adjacent to the College would always be available to the Fellows. It also provides land for possible further expansion of the College. The College paid $142,000.00 for the garage. Although it continues to serve the purposes mentioned above, it has not proved to be a financially profitable investment and, for the last several years, there has been some difficulty in collecting rent from the lessee. The Finance Committee considered, therefore, three possibilities: the first was to continue with

the present lessee under a renegotiated lease; the second was to tear down the garage and surface the lot for parking purposes; and the third was to sell the property. In the latter case, the College would net approximately $103,000.00 in cash. The last consideration was immediately discarded, as the same conditions pertain now as pertained some years ago when the property was bought, i.e. it ensures the availability of parking adjacent to the College and provides land for future expansion of the College. The demolition of the building and resurfacing the lot would require the expenditure of $35,000.00. This alternative was also discarded by the Finance Committee. Finally Mr. Jack, our agent, believes that when the present lease expires on March 1, 1965, he will be able to negotiate a new lease on better terms for the College. This Mr. Jack was instructed to do.

Miscellaneous Financial Items

In February 1964, the College of Physicians received a gift of $10,000.00, establishing the Theodore Franklin Bach Memorial Fund. The income is to be used to support a series of Theodore Franklin Bach Lectures pertaining to rheumatology and related fields. The gift was made by the Misses Mildred P. and Marion Bach, sisters of Theodore Franklin Bach, M.D. When sufficient income has been generated from this fund, the first lecture of this series will be inaugurated.

Under the able chairmanship of Dr. George Blumstein, the Mitchell Associates continue to grow. Now there are 125 Associates, each of whom has pledged, or paid, $1,000.00 to endow a journal for the College. This represents probably the most significant fund-raising effort for the College over the past three or four years, and we are all greatly indebted to George Blumstein for his magnificent efforts in behalf of the College. I should mention also that the second S. Weir Mitchell dinner was held in the College of Physicians' Mitchell Hall in September 1965. All the new S. Weir Mitchell Associates were presented with plaques illuminated with the College seal and engraved with their names. Later they received matted bookplates and legends similar to the ones which are pasted in every bound volume of the journal they support. Several of the advisors of the College were invited to this dinner but only one was able to accept, Mr. John A. Diemand. He enjoyed the occasion very much. I might add that Mr. Diemand made a generous gift of $1,000.00 to the College of Physicians in December of the past year.

On the advice of our certified public accountant and Mr. Eric McCouch, our legal counselor, two separate bank accounts were established, one to be known as "the principal account" and the other to be known as "the income account." In the principal account, the proceeds of all sales of securities, etc. will be placed and in the income account will be placed all interest and dividends from securities. The separation of funds into these two bank accounts should do much to simplify the financial transactions of the College. By action of Council on 29 December, 1964, such separate accounts were established as of January 1, 1965.

Present Financial Status

One might ask, with the increase in dues generating an increase in income of $30,000.00 a year and the changes in our portfolio of securities resulting in an increase of annual income of something over $17,000.00, giving a total increase in income of $47,000.00, why should not the College be well in the black? The fact is that we hope to be operating in the black during this current fiscal year. The reason we are not way ahead of the game is the fact that we have had accumulated deficits in two main areas: 1) inadequate amounts have been paid into the pension reserve in the past and the present accumulated deficit of $24,000.00 will be wiped out over the next ten years by annual payments to the Insurance Company of North America; 2) the income of many funds is restricted to specific purposes, and although the over-all income and expenses may leave us in the black, we may be deficient in certain areas. For example, we were over-expended by $39,000.00 in our current operating account as

of November 10, 1963. As of June 30, 1964 (a short fiscal year of seven months and three weeks), our current operating account was only over-expended by approximately $23,000.00, a decrease of $16,000.00. Most of this improvement, of course, can be attributed to the increase in dues.

Plans for the Future

It can be seen by what has been stated above that the College must still concern itself with immediate and long-range financing. The Finance Committee plans to review the securities in our portfolio at six-month intervals with a representative of the First Pennsylvania Company. We hope to get active aid from our Advisors concerning our investments. Your Officers and the Council plan to activate and intensify a drive to have Fellows and Friends of the College make substantial bequests to the College in their wills. This should not prove to be a difficult task. It might interest you to know that one of the Fellows of the College has a bequest of $100,000.00 in his will to support the Library of the College of Physicians.

It is more difficult to undertake a drive to increase our general endowment fund. The Council of the College, in December 1963, recommended that we start such a drive. This has not yet been done. However, it is important to realize that if we can generate more annual income by other means, this will automatically increase our general endowment funds because interest and dividends can be reinvested. Plans for interesting non-medical "Friends of the College" to make annual contributions are under consideration.

Finally, I must complete this annual report by extending thanks for the help received from our Advisors, John Diemand and Edward Hopkinson. I again extend my thanks and those of the College to our honorary legal counsel, Eric McCouch. He has given freely of his time to help the College with its problems. I should like especially to thank my fellow officers and the chairmen and committeemen of the College who give so freely of their time and energy in support of this famous old institution. If I mentioned one I would have to mention all, as everyone has given much of himself to the College during the past year. The same is true, of course, of the 37 members of the staff of the College. I must mention three of them, however; Miss Lang, in the front office, has now completed twenty-nine and one-half years of devoted service to this institution. In appreciation of this, a year ago she was appointed Executive Secretary of the College by the Council. I am especially grateful to Mr. Elliott Morse, the Librarian of the College, for all his devoted work this past year. He has been of great assistance to us both in the affairs of the Mitchell Associates and in establishing the new pension plan, in addition to performing all his duties as Librarian.

Mr. George Allen, the former Superintendent of the College, retired on May 1, 1964, after many years of loyal service to the College. We are grateful to both Mr. Allen and Mr. Morse for selecting an able successor to Mr. Allen in the person of Mr. Theodore Kolodziejski. Mr. Kolodziejski has been a whirlwind of activity since taking on his responsibilities as Superintendent. He has renovated many parts of the College building, including rebuilding the Cloak Room adjoining the lower lobby, rebuilding the Thompson Hall public address system, building a display cabinet for the memory book, laying floor covering in the Library study rooms and hallways and in the basement kitchen, construction of the janitor's dressing room and a storage closet in the kitchen area of the basement. In addition to all this, he has thoroughly renovated the superintendent's apartment with the installation of a new bathtub, shower enclosure and linen closet. His great hope is to install air-conditioning throughout the College building. We have plans underway to help Mr. Kolodziejski achieve this ambition. This ends my annual report to you as your President. It has not been for me a year of arduous labor, but rather one of great joy to be associated with such a fine company in working for the interest of your College.

Universities of Health and the Future of Medical Practice[1]

By JOHN E. DEITRICK, M.D. [2]

PRESIDENT GIBBON, Secretary Langner of this lectureship committee, Fellows of the College, and friends. I find it slightly embarrassing to deliver a formal lecture before some of my best friends who are residents of this city. I have received personal letters of regret from several others who cannot be present this evening.

I can say sincerely that I was honored to be asked to give this 88th Mary Scott Newbold Lecture, especially when I reviewed the names of my distinguished predecessors. In fact, I began to wonder about the wisdom and judgment of this lectureship committee in extending the invitation to me. Why did the committee select the dean of a medical college? Only four of the previous lecturers held deanships, and two of them for relatively short periods of time. Perhaps today we have reached a stage in the development of medical science, of medical education and of medical practice when the deans and senior faculty members of medical schools should be asked to express their ideas about medical education and medical practice. I feel that I have been placed in a position similar to the one in which Mr. Adlai Stevenson found himself when he was a candidate for the presidency. The story he tells is that on leaving a plane in Chicago he was met by a large crowd of his supporters and as he stepped down from the plane he saw in the front row of his admirers a very pregnant young lady carrying a large placard with the words "Stevenson is the Man"—in similar fashion I must be your dean!

As an aside, let me remark that being a dean is a hazardous occupation. Their half life is something less than four years. At the most recent meeting of the Association of American Medical Colleges twenty-two new deans were introduced, representing 25% of all the deans of the medical schools in the country. The social and behavioral scientists who are finding medicine a very interesting field for study might well devote some of their time to the deanship and the deans. The majority of us are in office for such short periods of time that it is difficult to find a mature dean who has had time to develop clear-cut ideas about his job and about the future path of his medical school. Having been a dean for almost six years, I have exceeded the average, but I claim no unusual maturity nor wisdom about the future of medicine. This evening I will venture to describe to you the development of medical colleges as I see them today and the probable effects of their educational programs on the practice of medicine and the medical profession. Some of the ideas and concepts may be only partially developed and not acceptable to many of you, but my apology rests on the fact that at any point in time in rapidly growing and shifting fields such as medicine it is difficult to grasp and understand all the trends and movements carrying us along in their ever-changing currents.

Historically there are four trends in medical education I wish to mention. The first was the elimination of the diploma schools and the development of medical schools with university standards offering courses in the sciences basic to medicine. The second was the establishing of full-time positions in the clinical departments. (The Rockefeller Foundation gave this movement a great forward thrust when in 1913 a resolution was passed, "directing the General Education Board to address itself to the establishment of full-time clinical depart-

[1] Mary Scott Newbold Lecture LXXXIV, The College of Physicians of Philadelphia, 4 November 1964.

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ments in *selected institutions.*" The objective was to place the administrative control of the clinical departments under physicians and surgeons who would give all their time to teaching, research and patient care in teaching hospitals.) The third trend was the establishment of standards for specialty training following the M.D. degree. The American Board of Ophthalmology (1916) was the first specialty organization to set such standards. The fourth trend was the development of research in medical colleges, first in a modest way in the 1920's by private foundations, and surging to its present massive proportions after World War II. Most of us will remember how important and really precious a $5,000 or $10,000 grant was thirty years ago. The foundations, in helping establish full-time positions and providing research funds for these men, had far-reaching effects on medical education and medical practice. Let us look at their impact upon us today.

The term "have" schools is currently used to describe those schools with large faculties, large funds for research, and adequate facilities. The "have not" schools have small amounts of research money and relatively few full-time faculty members. Suggestions have been made to the National Institutes of Health that research funds should be distributed on a geographical basis and weaker schools strengthened with larger research and training grants, which suggestion I believe to be absolutely unsound. Well-trained and competent men must first be employed before research funds can be used wisely.

The "have" and "have not" schools were differentiated some fifty years ago when foundations "selected institutions" for support. During and following World War II, when the Government and the public decided that much human illness and misery could be relieved through research, these "selected schools" had the full-time faculty members with the training and competency to man the research programs. The NIH program in medical research could not have been undertaken without these schools. I doubt if Mr. Gates, who advised Mr. Rockefeller, and Drs. Welch and Flexner could have possibly envisioned in 1913 the far-reaching effects of their plans for certain medical schools.

Let us follow further the effects of the full-time system. Clinical full-time positions as established in the ivory towers of the teaching hospitals are being copied by non-teaching hospitals today. Both private and public hospitals are establishing full-time or geographic full-time chiefs of clinical services as well as directors of education for the house staff and attending staff.

Finally, the entire profession is moving more and more toward salaried employment. A physician is not looked down upon because he works for a salary, rather than for a fee for service. When I was in medical school we still felt that the man on salary was not quite as able or competent as the better physicians in private practice. Over the last 25 years I believe this attitude on the part of the students has changed. They now have considerable respect for the young full-time men and talk rather deprecatingly about the L.M.D. The result—in 1964, 11,000 physicians were employed by hospitals, plus another 35,000 interns and residents; 21,000 more were employed by Government. The total of 67,000 thus employed was one quarter of the 278,275 physicians in the country, 10,000 of whom are retired. In fact, it is estimated that if physicians working for labor and industry are included, one third of all physicians are now on salary. I suspect that if personal income taxes continue to rise and the costs of private practice increase, we may expect the number on salary to increase proportionately also.

I have selected the development of the full-time principle and its far-reaching effects as an example of the potential effects upon medicine of present developments and changes occurring in the medical college. There are four developments which I will discuss. The first is the relationship between universities and medical centers, the second is the impact of research on practice, the third is the changing

curricula of medical colleges, and the fourth is the problem of the organization of professional service for patients.

For more than fifty years the medical schools have tried to identify themselves more closely with universities. Leaders in medical education realized that universities were stable and had maintained educational standards for centuries and that medicine must be under university supervision. On the other hand, universities and their presidents have been hesitant to become too involved in medical education for at least two reasons. The first is because of the dominating role the American Medical Association has played in establishing standards for and approval of medical schools without consulting the universities. Some universities feel that medical schools and their faculties are controlled by the practicing profession. The second reason is that medical centers have become so large and complicated, dealing with large sums of money and complicated inter-institutional relationships, that a president usually does not have the time and interest to devote to the medical college and its affiliations. He, therefore, appoints a vice president or gives the dean greater responsibility and authority than he would to a dean of one of the other colleges in the university.

Two slides may demonstrate the universities' dilemma. Slide 1 shows the size of one medical school and the numbers of interns, residents and fellows in its affiliated hospitals. Note that the faculty outnumbers the students and equals that of the entire university which has more than 12,000 students enrolled. However, because of a voluntary faculty system, perhaps one half of these men can devote little time to teaching and research.

Slide 2 shows the expenditures of the hospitals and the medical school. Forty-four and one half million dollars were spent on patient care, four million directly on undergraduate medical education and sixteen million on research, or one third as much as is spent on medical care and education combined. The total expenditures of the hospitals and medical college, sixty-five million, was equal to more than half the expenditures of the entire university.

Because of the size and complexity of medical centers and the increasing numbers of health personnel receiving education and training in them, the suggestion has been made that they become independent universities of health. The next two slides document the variety and numbers of students receiving all, or a major part of, their instruction in the medical college and medical center of a large state university. Should this medical center become an independent institution? If it should, medicine would again become separated from the universities. I believe this is the wrong direction for medical centers to go. Other colleges in a university can give basic instruction to many of these students, as can two-year colleges. The center can be used for their practical training when their basic course work is completed. There would also be many educational and curricular problems in trying to give courses for this great variety of students with variable academic backgrounds and intellectual capacities.

One fact seems certain about medical centers—specialized hospitals will gradually be incorporated into them. I believe separate and isolated hospitals for psychiatry, pediatrics, orthopedics, ophthalmology, cancer, etc., will disappear and will adjoin or become incorporated in general hospitals as parts of medical centers.

Some universities are beginning to take a positive point of view toward their medical colleges and medical centers, realizing that these centers offer the entire university opportunities to study man, his behavior and his environment, as well as his health. The faculties of colleges of the university other than medicine are finding and will continue to find the centers valuable in their work.

Let me turn now to the second major trend in medical schools—the growing research effort. It receives greater financial support than any other single activity. Some 18,000 physi-

cians, or 8% of all active non-federal doctors, are in teaching, research or laboratory work. With the awarding of General Research Support Grants to all medical colleges by the NIH, the colleges can and are expanding the number of full-time faculty. What may be the impact on medicine? Some educators believe that retaining more men on full time may give rise to an inadequate supply of practicing physicians. Estimates have been made which show that by 1975 if we continue to import 1,600 foreign educated physicians per year and increase the output of our own schools by 2,000, we will more than maintain the present ratio of doctors to population. Such figures do not tell us how many physicians will be providing direct patient care. We are gambling that the research workers will provide the practicing physician with more knowledge, better tools and means of therapy so that he may use his time and talents more effectively on larger numbers of patients.

The full-time men we are training in research and teaching today will be the faculty members for ten or more new medical schools which will be in operation within the next five to ten years.

I have frequently speculated about the psychological impact of our research efforts on our medical students. Many of them are working in research laboratories during their vacation periods. I believe the exposure to and participation in research work will help them to become more critical, thoughtful and intelligent practitioners. If the research influence follows the same path as did the development of the full-time principle, we may find many of our graduates developing clinical research in their community hospitals. The intellectual life of the staff of such institutions will be invigorated, their continuing education improved and their patients should receive better care.

The third area for discussion is the curriculum. There are at least two major trends developing in the medical colleges. The first is an attempt to more closely coordinate college and medical school education with the objective of shortening the time required for the student to obtain the M.D. degree. There is considerable enthusiasm for such programs, especially for selected groups of students. It is my personal opinion that this is the wrong period to shorten the education and training of a physician. There is certainly no less to learn about science and medicine today than, say, 25 years ago, nor is there any less reason why a physician should not have a good four-year college education. If the trend should grow we will probably have doctors well trained scientifically but lacking in breadth of knowledge and scholarship. The present prolonged program of internship and residency training thought necessary to produce a competent physician is due partially to the requirements of the Specialty Boards. The demands of the armed forces for young physicians, reflected in the continuation of the doctors draft law, adds another two years to the young physician's required service. Little attempt has been made to curtail either of these periods. The internship and residency programs have provided the public with very competent physicians. Perhaps the periods should not be shortened, but rather the stipends at least doubled so that the services of a young doctor seven years after medical school might be valued at ten to twelve thousand dollars. The residents are certainly practicing medicine and caring for some of the most seriously ill patients. They are hard-working, productive physicians who deserve a higher status in the profession and better recompense.

The second curriculum change is a result of a certain degree of faculty frustration. There is the realization that as scientific knowledge increases the boundaries between departments and disciplines become less well defined and that it is almost impossible to decide clearly what and how much information should be given to the student in four years. The trend in curriculum design is to integrate departmental instruction and to develop a core curriculum eliminating much detailed information and instruction in the medical and surgical specialties. The student will be given free or elective time in which he may begin to special-

ize and explore areas of medicine of particular interest to him. The students graduating from such programs will lack information about many phases of medicine and as they progress through straight internships and residencies they will become more specialized than the men of our generation. What will be the form or organization of their medical practice?

This question brings us to the fourth change or major trend undergoing study in some medical schools. How do we organize groups of specialists and research workers to provide family care or comprehensive medical care? I believe most medical schools and teaching hospitals are not satisfied with the organization of their ambulatory or outpatient departments. These should be the models for integrated practice which might be followed by our graduates. At present the outpatient departments are generally composed of twenty or thirty specialty clinics functioning quite independently and in which patients are referred from one clinic to another. There are many delays and frustrations in obtaining laboratory, X-ray, and consultative reports. The doctor is frustrated and the patient sits on benches hour by hour and passes from clinic to clinic. At Cornell we have had in operation for some years a comprehensive care clinic in an attempt to correct these difficulties. We have partially succeeded but the organization of our service is still far from perfect, and we are still experimenting.

To return to the previous question of how may our highly specialized graduates practice in the future, I'm inclined to believe that they will follow the present pattern of inpatient care in our teaching hospitals rather than the very imperfect outpatient department models. On our wards they are being taught a pattern of highly cooperative and integrated patient care with surgical and medical specialists and basic scientists becoming more dependent upon one another as they deal with organ transplants, auto-immune reactions, resistant staphylococcus infections, congenital malformations and similar complicated problems. Their offices are likely to be attached to or incorporated into hospitals. The hospital laboratories will be used for the study of larger numbers of ambulatory patients and will provide services impossible for the private physician to maintain. They will no doubt make greater use of more assistants. The pediatrician, instead of spending more than half his time advising mothers on formulae and examining and vaccinating well babies, may have assistants who will perform these duties while he devotes more time and attention to consultations and to the more complicated illnesses of his patients. The obstetrician may be the director of two or three assistants or midwives who will be responsible for the normal deliveries while he cares for the abnormal. When our population passes the two hundred to three hundred million mark we must use our highly trained specialists more efficiently. Their training should not be dissipated on tasks which others, less well trained, can perform.

Another experiment being carried on in medical colleges may lead to more effective use of a doctor's time. Much is said about the maintenance of health and the prevention of disease, but in many instances we are too ignorant of the causes to take any steps toward prevention. The periodic or yearly health examination is used as an example of a direct approach to the maintenance of health and to the early detection of aberrations which can easily be corrected. How many of our 180,000,000 people could afford such attention today and how many physicians would be required to do the job? This is certainly not a realistic way to utilize a physician's time in the maintenance of health. Our students and the practicing physicians have been accustomed to using screening tests such as X-rays of the chest, the Wassermann reaction, the tuberculin test and others for the detection of various diseases. We need more general tests which may be administered by assistants and which will indicate to the physician those patients who should receive his time and attention. At Cornell we have been testing such a tool now for some fifteen years. It is called the Cornell Medical Index Health Questionnaire.

It is a list of some 200 simply stated questions about mental and physical health which can be answered by a patient by simply checking a "yes" or "no" after each question. The test has not received the approbation of all physicians. Last year I received a very critical letter from one of our graduates practicing in Texas who saw a patient whose previous medical record, forwarded to him by another doctor, contained a copy of the Cornell Medical Index. He wanted to know to what depths the Medical College had fallen to put out such a document which contained unscientific terms and such simple words and even slang that he felt it to be an affront to an educated person. He did not realize that clinic patients, and perhaps a large portion of our population, must be approached with simple, everyday terms.

Our students use the test routinely in our Outpatient Department. It does guide the physician to look particularly at special body systems, but I believe it is not designed for the manner in which we use it. It would seem a short step for our graduates to employ it in their practices as a means of quickly and easily detecting changes in their patients' state of health. The patient might be asked to fill out the questionnaire on a yearly or six-month basis. When changes in complaints appeared, those individuals could be brought in for a complete examination. The index has been used on large numbers of patients and can be submitted for computer analysis. As the population expands and our physicians become more specialized we will definitely need such screening methods so that deviations from health can be quickly detected and the proper doctor selected for the particular problem. This may seem like oversystematizing medicine, but I believe the trend in this direction is inevitable.

With systematization and specialization, what will happen to the family doctor, the personal physician and the doctor-patient relationship? Are the medical schools ignoring these aspects of medicine and making all students scientists? My answer is not yet. I attended a weekly conference of our organ transplant group some months ago. There were surgeons, pediatricians, internists and immuno-chemists present plus house staff and medical students. The conference began with the discussion of a patient who had received a kidney transplant. All the blood matching factors were discussed and the therapy to suppress the immune reactions, but the last twenty minutes or more of the hour were spent in discussing the emotional problems of the family faced with the decision as to which member might be willing to donate a kidney to one of the children suffering from renal failure. What would be the family status of a sister who might be found to most closely match the patient if she refused to be the donor? The consensus of the group was that family members should not be placed in such a position by physicians and that research must be carried out and methods developed to obtain healthy kidneys in cases of accidental death or by other means. The members of this large team of specialists were not callow and indifferent to their patients and family difficulties. A group cannot take the place of the family doctor but we are teaching our students, as are all other medical schools, that the internist or pediatrician is generally responsible for advising and guiding the care of patients whose definitive treatment may be provided by several specialists. Our accident rooms are becoming the family doctor and providing care for a steadily increasing number of patients over weekends when they cannot obtain the services of their own physician. Students participate in the care of these patients and have demonstrated to them how group efforts can provide emergency care to a community on a 24-hour basis.

Finally, how will medical care and medical practice be organized on a national basis? I want to show you a slide made from a chart which appeared in a Government report in 1948. It was termed "A Coordinated Hospital System." The description of the system stated, "the medical center would be the nucleus from which radiates the highest type of medical care out to the smallest community, even to the lonely farm house. There should be at least one such hospital in every state, preferably

associated with a medical school and other professional training centers." This report on The Nation's Health to the then President of the United States was made by Oscar R. Ewing, Federal Security Administrator. Many of us will recall the debates that were carried on with him by the A.M.A.

We are certainly developing large centers around most medical schools and the Hill-Burton Act for hospital construction has provided hospitals at the community level. Much of this plan exists today, but as yet there is no formal organization linking these hospitals together with the university health centers. Medical centers, however, are under pressure to extend their affiliations and influence. Within the last three years the Center where I work has been approached by three hospitals desiring an affiliation. Had we agreed to these requests, the college would have had under its supervision some 2,000 physicians and approximately 4,000 beds. One state today plans to construct several such centers around its medical colleges and to organize the health care of its citizens around these centers. I have always felt that the role of the medical college was to educate and train the personnel for these centers but not to assume the responsibility for their organization and for the supervision of medical care for large segments of the population. It appears, however, that the development of medical colleges and their health centers is following the pattern portrayed in the slide.

For comparison with this plan for the nation's health, I would like to quote a few paragraphs from a report made by one of our faculty members who made a study of the organization of medical care in Czechoslovakia and Russia.

"In most remote areas of Russia 'feldschers' and midwives represent the primary medical care facility. The midwives handle the routine obstetrical problems, while the feldscher functions very much like a well-trained medical corpsman.

"The most common basic unit of the Czechoslovakian and Russian medical networks is the health community, which serves a population of approximately 3300. This fundamental unit is staffed by an internist (who is always director), a pediatrician, a gynecologist-obstetrician and a dental surgeon.

"The 'District Institute of Health' meets the needs of 10-12 health communities (40,000-50,000 population) and consists of a hospital with approximately 400 beds plus a policlinic.

"For a population of approximately 150,000-200,000 . . . there is a second level hospital and policlinic. Such institutions contain between 700-1,000 beds and extensive outpatient services.

"The ultimate facility within this system is the Regional or 'third level' hospital and policlinic. These are university hospitals where all the sub-specialities are available. They are also the centers for undergraduate and postgraduate training of doctors. In Czechoslovakia there are eleven such centers and in Russia approximately eighty."

There can be no doubt about the similarity of the design of the two plans for the organization of health care. The decisive difference is that our community hospitals are community owned and operated and our medical colleges and centers are either privately or state supported. None is owned as yet by the Federal Government. In our free society the financial support of a medical center may come from many sources including federal, state and community funds as well as private gifts and endowment. The medical colleges in Pennsylvania are excellent examples of such wide varieties of sources of support. The system has great strength and potential for survival because it is flexible and can respond to both local and national health needs. At present there are no rigid rules or bureaucratic controls which can hinder experimentation and the introduction of new ideas for improving health care. The medical centers and medical colleges under our free system should continue to be pioneers and leaders. We may expect them to have decided influences upon the organization of and the mode of medical practice.

In closing, thank you, Dr. Gibbon and Dr. Langner, for giving me the opportunity to express my point of view as a medical college dean on the present and probable effects of the full-time principle, the development of health universities, medical research and medical school curricular changes on medical practice.

Thomas Eakins (1844-1916): Painter, Sculptor, Teacher[1]

By GONZALO E. APONTE, M.D. [2]

THOMAS EAKINS painted this portrait of himself (colored slide) when he was 58 years old. Completely a Philadelphian, he was the supreme pioneer of realism in American painting. In the portrait one can detect many traits of his character—a freedom from affectation which kept him close to his land and the life around him; indefectible integrity; and an extraordinary determination which gave solidity and continuity to his art during a time when restiveness and effervescent artificiality were the soul and essence of painting.

The self-portrait also shows a man tired and saddened. Sadness was not always a part of him. It came about through the continued rejection and misunderstanding of his art by the public. Eakins' art was imbued in science. He had a passion for anatomy, perspective and factual clarity and hated superficiality and sentimental clichés. John Canaday, art critic for *The New York Times*, stated it well when he wrote that "Eakins' trouble with his public was not that he painted in a way people did not understand (as is the case with much modern painting), but in a way people understood too well."

As a child, and also during his high school studies, he showed interest and ability in mathematics and the sciences. His family had a long tradition of craftsmanship and his father was a writing master. This influence probably played an important role in directing his scientific temperament towards art. But he liked painting, and the final decision to pursue that profession was his own. "Painting is so like mathematics," he once wrote, "because it turns complicated things into simple things."

In 1861, following his graduation from Central High School at age 17, he began studies at the Pennsylvania Academy of Fine Arts. But the instruction at the Academy in those days was poorly organized. The students were for a long time permitted only to draw and copy casts or paintings from the old classics. Eakins was not happy there. He thought it was absurd to spend so much time copying copies from life when there was so much life around him to be portrayed. It became clear to him that if he was to learn basic technique, he would have to go abroad. Consequently, he went to Paris to study at the Ecole des Beaux Arts under the direction of Jean Léon Gérôme. That was the time when impressionism was blossoming in the Parisian world of painting. Despite much resistance, impressionism grew with sweeping force and propagated beyond France with the speed of a pandemic. Eakins shared with the impressionists a faith in the commonplace as a natural source of inspiration. But, driven by a passion for precision and clarity, he could not express the commonplace in the coy manner or the candied and sparkling colors of the impressionists. He probably considered them as manifestations of art for art's sake, not art as part of science. He worked hard and drew many sketches but did not feel he was ready to paint his first picture. After three years in France he spent six months in Spain. In the naturalism of Velásquez and Ribera, he found precisely the thing he wanted to express in his own work, and their paintings soon became his favorites. In Seville he painted his first picture, which depicted a troupe of street entertainers.

Eakins returned to Philadelphia in 1869 and soon set up a studio on the top floor of his house

[1] Read before the Section on Medical History, The College of Physicians of Philadelphia, 8 December 1964.

[2] Associate Professor of Pathology, The Jefferson Medical College of Philadelphia, Philadelphia, Pennsylvania 19107.

on Mt. Vernon Street. At first he painted chiefly members of his family or close friends. Another favorite subject were sports events, such as boxing. He had become further convinced of the need to study the human body with scientific precision in order to portray it with the realism he sought. Consequently, in 1873 and 1874 he registered at Jefferson Medical College for the courses in Surgery under Dr. Samuel Gross; and in Anatomy, under Dr. Joseph Pancoast and Dr. William Pancoast.

The minutes of a meeting of the Jefferson Alumni Association, held on April 10, 1874, indicate that Eakins would be engaged to paint the portrait of Dr. Samuel Gross. The painting was completed early in 1875 and was presented to the Board of Trustees of Jefferson during the Commencement exercises held on March 11, 1875.

The Gross Clinic was exhibited a short time later at the Haseltine Galleries on Chestnut Street. It created a sensation, but the experience proved too shocking for the public and most of the criticism was unfavorable. Eakins was branded as barbaric, insensitive, and a degrader of the art. The Centennial celebrations of 1876 were opened in Philadelphia. Eakins submitted several of his paintings but the committee for art of the centennial rejected the Gross Clinic. It was finally hung in the medical section of the exhibition. What was perhaps an accurate appraisal of the situation is recorded in the comments of an art critic at that time—"It is rumored that the blood on Dr. Gross' fingers made some of the members of the committee sick, but judging from the quality of the works exhibited by them we fear that it was not the blood alone that made them sick. Artists have before now been known to sicken at the sight of pictures by younger men which they in their souls were compelled to acknowledge were beyond their emulation." The Gross Clinic was purchased by Jefferson for $200, three years after it was finished. In addition to the formal painting owned by Jefferson, there are also in existence a small sketch of the painting done in oil, at the Philadelphia Museum of Art; a study of Dr. Gross, head and bust, at the Worcester Art Museum; and a reproduction done on cardboard with India ink, at the Metropolitan Art Museum in New York.

In 1879, Fairman Rogers, a wealthy engineer and friend of Eakins, commissioned the artist to paint a portrait of a new coach he had purchased. To record the motion of the horses was a tantalizing problem to Eakins. He worked at it with his usual meticulosity and devised a camera which made a series of rapid exposures on a single plate. Later on, he extended his original work in a series of investigations conducted with Dr. William Marks, Whitney Professor of Engineering at the University of Pennsylvania. Eakins' work appeared in the chapter written by Professor Marks for a book on animal locomotion published for the University of Pennsylvania by J. B. Lippincott (1888).

Eakins' interest in the problem of animal locomotion was reawakened several years later, when he was commissioned to do two bronze equestrian statues for the figures of Lincoln and Grant which were to be placed in the Memorial Arch at Prospect Park, Brooklyn. He then wrote a paper, "On the Differential Action of Certain Muscles Passing More Than One Joint," which was published in the *Proceedings of the Academy of Natural Sciences* (1894).

At the age of 40, Eakins married Miss Susan H. MacDowell, fellow artist and a long-time admirer. They had no children. Despite opposition, he had become an important figure in Philadelphia art and in 1882, at the age of 38, had been appointed Director of the Pennsylvania Academy of Arts. He proceeded to reorganize it in a radical manner, but his progressive methods of teaching created increasing animosity and eventually led to his resignation 4 years later. After this, he often lectured on Anatomy at several art schools in New York and Washington, and at the Drexel Institute.

In 1889, upon the retirement of Dr. D. Hayes Agnew as Professor of Surgery at the University of Pennsylvania the students commissioned Eakins to paint the distinguished surgeon. The portrait was completed in three

months and Eakins was paid $750 for the work. The public received the Agnew Clinic as coldly and indifferently as it had received the Gross Clinic fourteen years previously. The Pennsylvania Academy invited Eakins to exhibit some of his paintings there and then withdrew the Agnew Clinic at the last moment. A similar rejection of the painting by the Society of American Artists led to his resignation from that group in 1892.

In the face of such adversity, Eakins' reputation gradually declined. There was only one private exhibition of his paintings in Philadelphia during his lifetime. Boston gave him his first award, for two water colors shown there in 1878. The second award came 15 years later—a Bronze Medal at the Chicago World Fair for 10 paintings, including both Clinics. Eleven years after that the Gross Clinic was awarded the Gold Medal at the Louisiana Purchase Exhibition in St. Louis. Increasing recognition came during the first decade of the century, when his paintings were awarded seven other prizes, including a belated one from the city of his birth. These awards were not enough to bring him the general acclaim he deserved. The famous painter John Singer Sargent, popular, rich and avidly sought by society, visited Philadelphia in the early 1900's. He was treated as king and was asked if there were any local artists he wanted to meet. There was only one, Eakins. The hostess did not even know the name.

This ignorance was not destined to last long. Soon after Eakins' death in 1916 the world would begin to acknowledge his greatness. In a short time more was written about him than had ever been written during his lifetime. The museums throughout the country, led by the Metropolitan Museum in New York, began to purchase his paintings. In 1930 Mrs. Eakins gave the Philadelphia Museum over sixty of his most important works. The critical appraisal of his work was well exemplified a few months later when the Museum of Modern Art in New York exhibited the paintings of the three American painters of the previous generation considered to have had the greatest influence on contemporary American art. The three were Winslow Homer, Albert Ryder and Thomas Eakins.

I would like to conclude this talk by showing some other colored slides of Eakins' paintings:

Chess Players, owned by the Metropolitan Museum of Art. The man standing by the players is Benjamin Eakins, the artist's father.

Mrs. Eakins, owned by Knoedler and Company.

Salutat, owned by the Addison Gallery, Andover, Massachusetts.

William Rush Carving His Allegorical Figure of the Schuylkill River, owned by the Philadelphia Museum of Art.

Max Schmitt in a Single Scull, owned by the Metropolitan Museum of Art.

John Biglen in a Single Scull, owned by the Boston Museum of Fine Arts.

Mending the Net, owned by the Philadelphia Museum of Art.

The Courtship [unfinished], owned by Mrs. John Richard Hacke of California.

Fairman Rogers Four-in-Hand, owned by the Philadelphia Museum of Art. This is the painting which provoked his aforementioned interest in animal locomotion.

Walt Whitman, owned by the Pennsylvania Academy of the Fine Arts. Walt Whitman once said that Eakins was not a painter but a "force," and that only he among all artists of the time would paint things the way they were, not the way people wanted them to be.

Many of Eakins' friends were scientists, and he painted portraits of many of them:

Dr. Benjamin Howard Rand, Professor of Chemistry at Jefferson from 1864 to 1877. Painted in 1874 and owned by Jefferson Medical College.

Dr. John H. Brinton, who helped to organize the Army Medical Museum. Together with Dr. Gross, Jr., he succeeded Dr. Samuel Gross as Professor of Surgery at Jefferson. Painted in 1878 and owned by the Armed Forces Institute of Pathology.

Professor William D. Marks, Whitney Professor of Engineering at the University of Pennsylvania. Painted in 1886 and owned by Washington University, St. Louis.

Dr. Horatio C. Wood, Professor of Materia Medica, Pharmacology and General Therapeutics at the University of Pennsylvania. Painted in 1889 and owned by the Detroit Institute of Arts.

Professor Henry Rowland, Professor of Physics at Johns Hopkins University. Painted in 1891 and owned by the Addison Gallery, Andover, Massachusetts.

Dr. Jacob Mendez DaCosta, Professor of Theory and Practice of Medicine at Jefferson Medical College. Painted in 1893 and owned by the Pennsylvania Hospital.

Frank Hamilton Cushing, renowned ethnologist. Painted in 1895 and owned by the Thomas Gilcrease Institute of American History and Art in Tulsa (slide not shown).

Dr. James W. Holland in "Dean's Roll Call." He was Professor of Medical Chemistry and Toxicology at Jefferson for 27 years, and also Dean from 1887 to 1916. Painted in 1899 and owned by the Boston Museum of Fine Arts.

Dr. William Smith Forbes, Professor of Anatomy and Clinical Surgery at Jefferson. He drew up the Anatomical Act of Pennsylvania, made into a law in 1867. Painted in 1905 and owned by Jefferson Medical College.

Dr. William Thomson, who was on the staff at Wills Eye Hospital and later became Professor of Ophthalmology at Jefferson. Painted in 1907 and owned by The College of Physicians of Philadelphia (slide not shown).

Dr. Edward Anthony Spitzka, Professor of Anatomy at Jefferson. Unfinished portrait, started in 1913 and owned by Mr. Joseph Hirshhorn of New York City.

Robley Dunglison: An Eminent Figure in Philadelphia Medicine[1]

By SAMUEL X RADBILL, M.D. [2]

ROBLEY DUNGLISON was born in 1798 at Keswick, England. Coleridge and Southey were living there during his boyhood and he was a friend of Coleridge's son. After a good classical training, Dunglison was apprenticed for a short time to a local practitioner, and then completed his medical education in Edinburgh, London and Paris. At the age of twenty-one he passed his examinations at the Royal College of Surgeons and at the Society of Apothecaries, thereby acquiring the right to practice medicine in London.

He spent the next five years as an assistant to Charles T. Haden, one of the foremost physicians of London, and made many profitable medical acquaintanceships. From Haden and his wife, Dunglison was inspired with a love for music that was much in evidence during his Philadelphia days. While in London, Dunglison rapidly broadened his professional connections by joining the London Medical Society and the Hunterian Society and by engaging energetically in medical literary pursuits.

In 1823 he obtained a medical degree from Erlangen, Germany, by examination, submitting a thesis and paying the required fee. It was difficult and expensive to get the degree in England so that the majority of British physicians at that time acquired their medical degrees in this way from Germany. He then decided to specialize, by teaching privately obstetrics and pediatrics—and had already enrolled one student—when he was recommended for the chair of medicine at the University of Virginia which was about to open. After hasty negotiations, he accepted. He thus became Professor of Medicine at the age of twenty-seven.

In Virginia he came under the influence of Thomas Jefferson. Although the venerable ex-president, who was over eighty when Dunglison first met him, lived only another year or so, he exerted a marked effect upon Dunglison's personality. Jefferson's daughter, Mrs. Martha Randolph, was likewise an important element in Dunglison's American formative years; in after years her numerous children and grandchildren remained in close contact with Dunglison and his family. Jefferson had instilled a strong desire in Dunglison to some day move to Philadelphia. Jefferson considered Philadelphia the center of scientific learning in the early days of the Republic. While he disapproved of much of the medical theory and practice of his day, he sent his grandson to the University of Pennsylvania, emphasizing the importance of a knowledge of anatomy and the natural sciences in the well rounded education of a Virginia gentleman. Jefferson was enthusiastic about the American Philosophical Society and Dunglison was elected to this distinguished body before he left Virginia. From the time of Franklin and Rittenhouse this group had strong ties with the University of Pennsylvania. Jefferson maintained a high regard for Benjamin Rush, Caspar Wistar, Benjamin Smith Barton, and, in particular, Joseph Priestley: all of these had University of Pennsylvania connections, even if the latter did turn down the chair of chemistry there. This attitude of Jefferson's toward Penn and those connected with Penn evidently left its impress upon Dunglison.

Dunglison soon began to receive many attractive offers attempting to entice him away from Virginia. He was first invited to join the

[1] Read before the Section on Medical History, The College of Physicians of Philadelphia, 8 December 1964.

[2] Past Chairman, Section on Medical History: 7043 Elmwood Ave., Philadelphia, Pennsylvania 19142.

Jefferson Medical College faculty by W. P. C. Barton in 1829, but he was well aware at this time of the neonatal hazards confronting this infant school, and refused. He had only recently prevailed upon his friend, Robert M. Patterson, to come to Virginia instead of accepting a post at Jefferson. He also felt that he was still obligated to the University of Virginia. Patterson, and his brother-in-law, Judge John K. Kane, became lifelong, intimate friends of Dunglison; these two were founders of the Musical Fund Society of Philadelphia in 1820, which Dunglison joined with alacrity when he came to Philadelphia.

Mrs. Dunglison suffered from rheumatic fever and it was believed that a change of climate would be beneficial to her health. This induced Dunglison in 1833 to accept the chair of Materia Medica, Therapeutics, Hygiene and Medical Jurisprudence at the University of Maryland. Nathan Potter, Nathan R. Smith and Eli Geddings were faculty associates. At the University of Virginia his "covenant" had restricted him from private practice, permitting only consultations. He was thus the first full time salaried professor of medicine in this country. This enabled him to devote himself to his teaching duties and pursue literary research and writing. In Baltimore, for his income, he had to depend largely on tuition fees from students that could be attracted to his lectures. But one of the enticements of the Baltimore faculty was the opportunity to develop private practice. He was told he would become known to patients through his teaching. This never occurred. Much as he decried the fact that patients shunned the doctor who was too learned, he really had neither talent nor enthusiasm for private practice. His special talents were teaching and writing; he had an inordinate ability to sift the literature, to know what was practical, important and useful, and he was an expert in communicating this information to his students. A natural conversationalist with a ready flow of language that was interesting, convincing and informative, he was decisive, leaving no confusion or doubt in the student's mind. At the same time he stimulated his students to think for themselves and inspired them with a love for practice. They then became successful practitioners with a broad spectrum of intellectual knowledge, for he was well versed in phases of literature other than the purely medical. The first one to give a separate course on the history of medicine in this country, he presented much of the historical development of his subject in all his other lectures and writings. He was an intellectual, not a doer, in medical practice. His doing was most effective in speaking and in writing. His textbooks, comprehensive and well organized, were in great demand among the rapidly growing student population of this country and proved to be a bonanza in augmenting his teacher's fees. At the same time they won for him a world wide fame.

Dunglison was not long in Baltimore before he was engulfed in the disruptive faculty dissensions that plagued the Maryland Medical School as it did all others. He always was pleased when he was designated as "The Great Pacificator", but his talent as a peacemaker was severely strained, so that when Drs. Pattison and Revere came from Jefferson Medical College to Baltimore on a raiding expedition in search of good teacher prospects, he was most receptive. A friendship was developed which eventuated in the appointment of Dunglison to the Jefferson faculty in 1836. Here, too, he found faculty politics as undignified as anywhere.

The behavior of faculty members towards each other in the early medical colleges of this country was not always as decorous and gentlemanly as it is presumed to be to-day. Probably the business aspect of medical teaching was partly responsible, although it was an era of ruthless ambition and struggle for power and prestige in a growing nation. When John Morgan started the first medical college here two hundred years ago he was permitted by the trustees to charge each student a separate fee. This system then prevailed in this country until in 1871 Harvard University undertook to collect the fees and administer the affairs of the medical department by means of an

annual budget. At Yale this took place in 1880, and at Penn not until 1896, although in 1878 the first permanent endowment of a medical professorship, the John Rhea Barton chair of surgery at the University of Pennsylvania was established by Mrs. Barton in memory of her husband. In the first half of the nineteenth century rugged individualism and personal ambition dominated the actions of everybody. As one observer said: "Freedom of thought and action produces that collision of mind which permits none but nature's noblemen to rise successfully above the dark waves of oblivion. Its motto is *Excelsior*. The aspiring and ambitious enthusiast echoes and re-echoes, '*Excelsior, Excelsior.*'" Overpowering ambition led to extremes of discord among medical teachers. Such personal rivalry had much to do with the bitter antagonisms among the first medical faculty that later led to public invective and accusations against each other by Rush, Morgan and Shippen in a Revolutionary War court martial that served only to disparage the medical profession as a whole and lessen its usefulness to the public.

Throughout his teaching career Robley Dunglison strove to elevate the standards of medical education and curb dishonorable competition among medical teachers and among medical schools. One of his greatest successes consisted of organizing a highly respectable medical faculty at Jefferson Medical College that placed the college on a firm basis, produced harmony between it and the University of Pennsylvania and resulted in making the medical teaching profession of Philadelphia a model of proper professional etiquette. Prior to this, rivalry among members of every faculty had been growing ever more intense. Each student paid each professor fifteen or twenty dollars for each series of lectures. Two series were required for graduation. In 1836 at Jefferson Medical College there were 364 students matriculated so that a chair was worth almost $6,000 per annum when Dunglison came here. The annum lasted only four months. During those four months only an hour or two a day as a rule was taken up for each teacher in lecturing. Teaching interfered very little with private practice. Small wonder that we read, in so many early accounts, of strife and acrimony among leaders in the profession:

"From the time of my appointment," one recorded, "I attended regularly the meeting of the Jefferson Medical Faculty, most of whom were so indecorous and turbulent, owing to the disputes and the ungentlemanly deportment of the members toward each other, that attendance at them was really painful. On one occasion at a regular faculty meeting, Professor Barton shook his fist in Professor Rhees's face."

This is an exaggeration by a disgruntled, discharged teacher, but it points up the cat-and-dog type of faculty politics with which Dunglison had to contend and which he finally corrected. The infancy of Jefferson Medical College was feeble and personal dissensions repeatedly threatened utter destruction of the school. Litigation and discord between two professors occurred in 1826–27; the next session, 1827–28, Nathan R. Smith left the school in the lurch and George McClellan had to assume Smith's teaching duties as well as his own. The next session the faculty had to be dissolved by the trustees and Barnes was relieved of his duties. Professor Eberle had to step into the breach by adding that professor's duties to his own. In 1830 Daniel Drake accepted the chair of theory and practice only to raid the faculty for a school he was planning in the west. He left Jefferson Medical College after one session, taking Eberle with him. In 1832 Granville S. Pattison joined the faculty. The young and struggling college had appointed no less than eight professors in as many years. But in spite of all these difficulties, and notwithstanding one of the worst financial depressions this country ever suffered, the number of paying students increased year by year, so that by 1836 the class amounted to 364 and the graduates to 134, the largest graduation list in the country.

"I had not been long in Philadelphia" Dunglison wrote in his *Autobiographical Ana* (p. 86), "before I discovered that not the best

The Famous Faculty of 1841, Jefferson Medical College of Philadelphia.

Thomas D. Mütter, M.D., LL.D
Institutes and Practice of Surgery

Joseph Pancoast, M.D.
General, Descriptive and Surgical Anatomy

Robert M. Huston, M.D.
Materia Medica and General Therapeutics

Robley Dunglison, M.D., LL.D
Institutes of Medicine and Medical Jurisprudence

John K. Mitchell, M.D.
Practice of Medicine

Franklin Bache, M.D.
Chemistry

Charles D. Meigs, M.D.
Obstetrics and Diseases of Women and Children

feeling existed between the members of the faculty in the Jefferson Medical College." Especially serious, was the unpleasant state of feeling that existed between Granville S. Pattison, and the founder of the school, George McClellan. Dunglison was soon "brought into unpleasant collision" with McClellan and the contentions became so urgent that the Board of Trustees, for the second time, had to dissolve the faculty. When it was reorganized, George McClellan was left out. The fortunes of the school then receded, the student enrollment declining abruptly. In the middle of the school session, one of the professors died, and Pattison

and Revere, despairing of the success of the college, eagerly accepting chairs in the newly organized medical faculty of the University of New York, unceremoniously left Jefferson. Dunglison weathered the crisis and the reorganization of 1841 was accomplished.

In this reorganization, Dunglison, who was probably alone responsible, realized that Jefferson Medical College had to live amicably with the University of Pennsylvania in this City of Brotherly Love. He had close ties of friendship with all the University trustees and faculty, except Nathaniel Chapman. Chapman had developed a marked antipathy to Dunglison, first because he was a foreigner, then because he was associated with Pattison, arch enemy of Chapman, and finally because of the traditional antagonism of the University to Jefferson as its first rival school. When Dunglison arrived at Jefferson, one of his first actions was to subdue the "active warfare" carried on by Pattison and the Jefferson faculty against the University, and he was able to report in his *Ana* that before a year had expired after his arrival in Philadelphia all the professors of the University had called upon him with the exception of Chapman (p. 84). Except for Dunglison, all the members of the new Jefferson faculty were graduates of the University of Pennsylvania. Jacob Randolph, Philip Syng Physick's son-in-law, was chosen as the professor of surgery, but he had a change of heart. He was in Europe at the time. When he returned he was welcomed with a public dinner "worthily headed by the venerable Chapman." Dunglison, Huston, Samuel McClellan and other Jefferson worthies attended, but Randolph was absent thereafter from the Jefferson roll.

Franklin Bache was a member of the new faculty. He was a descendant of Benjamin Franklin, deified parent of the University of Pennsylvania. John Kearsley Mitchell was close to Chapman, who had been his preceptor. Clearly Dunglison, in forming this group, proved his talent as Pacificator. His avowed aim was not just to benefit Jefferson College. "With the College thus fitly organized," he proclaimed, "the effect must be to render Philadelphia still more the center of medical education in the Union. The higher the reputation of the schools and the more harmonious their cooperation in the great work of medical instruction, the more certainly must this result be accomplished." By thus staunchly advancing ethical conduct among medical teachers and medical schools, he was certainly successful in his aims. Philadelphia has continued as an outstanding center of medical education, disreputable antagonisms among medical teachers has disappeared and medical schools no longer strive disgracefully to detract each other while puffing up their own advantages.

Dunglison should also receive great credit for his role in improving the quality of the candidate for admission to medical school. The medical students of the late eighteenth and early nineteenth century were apt to be an unkempt and unruly lot. The odium which they often inspired was recorded by a woman traveller as follows: "What are called medical colleges are nothing more than so many dens of speculators, to swindle the public first out of their money and then turn armies of literal murderers loose upon them. From 140 to 150 of these legal murderers were licensed at Charleston while I was there. The students are a vulgar herd from the interior, from the mountains, from little villages, and are mostly people of no fortune, no learning, no principle and wishing to live without work by attending the lectures. It is the same throughout the Union. These ignorant cubs are the terror of the citizens during the winter, chasing negro women, insulting white women, frightening children, pilfering and rummaging shops, taking the streets and sidewalks, blackguarding and insulting everyone they meet and as ignorant, and more so, than are half the negroes. A medical student is the lowest character in Charleston. Now, the faculty cannot help the ignorance of these fellows, but they could help giving them a license. It was amusing to see them running into book-stores and druggists purchasing a few dollars worth of books and medicines, to commence killing forthwith"

(Tryon, Warren S. *A Mirror for Americans 3*: 290, 1952). The gruesome humor of the medical student escapades in Cincinnati during the same period also may have been amusing when it was published by the *Louisiana Swamp Doctor* but it certainly did nothing to raise the public esteem for the medical student. Even at the beginning of the twentieth century the Flexner report castigated the low standard of medical student requirements.

At the University of Virginia, as elsewhere, student discipline was a serious problem when Dunglison was there. Feeling ran high against foreigners and student riots broke out in protest against the foreign professors. These riots were quelled with difficulty. Thomas Jefferson desired to organize a democratic system of student self-government, but nightly disorders increased to such an extent that two of the professors resigned. This led Dunglison to prepare a study on "College Instruction and Discipline" which was published in the *American Quarterly Review* in 1827. In his *Autobiographical Ana* (p. 43), he stated that this article was suggested by a convention formed to establish the University of New York and that he sought to canvass the great questions of instruction and discipline in the higher schools of the nation. It contained an important discussion of the subject of student co-operation in the matter of college discipline. Dunglison was opposed to Jefferson's student self-government plan. The evils of what he termed "Burschenschaft," which inculcates in the student that it is a stigma to testify against a fellow student, led to a breakdown in faculty control over the students and Jefferson's scheme had to be modified. Amherst College tried to institute Jefferson's modified scheme of student self-government, but most other colleges followed along the lines of Dunglison's general recommendations. For the medical student, Dunglison favored preliminary education in mathematics, languages and the sciences. He did not favor the preceptorship, and soon this form of medical education in this country became nominal, the preceptor acting more in the role of sponsor of the candidate for entrance to medical school, than as an active teacher of the medical student. Soon after coming to Jefferson Medical College, Dunglison presented much of his views on medical education in a book entitled *The Medical Student*, first published in 1837.

Dunglison drew about him the learned men of the day with whom were welcomed the medical student as well as the cultured citizen. In this way he fostered a closer relation between teacher and student. This was of inestimable value to the medical neophyte in the development of proper conduct and medical etiquette. He took up his residence on the east side of Tenth Street, South of Walnut, close by the Jefferson Medical College. Next door to him lived the Mayor of the city, John Swift. When Henry Clay visited Mayor Swift in 1848, he blew out the gas light when he went to bed, and Dunglison was called in to resuscitate him when he was overcome in his sleep. Men like Ingersoll, Patterson, Kane, Richards, Biddle, some of whom were trustees of the University of Pennsylvania, were guests in his home, as were trustees of the Jefferson Medical College, fellow members of the American Philosophical Society, teaching colleagues from all parts of the country and celebrated foreign visitors. One evening a week was set aside for a party at his home to which medical students were also invited. This encouraged other members of the faculty to follow suit and formed a valuable feature of the student's education.

Before 1840 it was the general custom for the student to undergo a series of oral examinations before graduation. It was necessary for each professor to pass on the student and frequently serious problems arose when the student failed one or more of these personal examinations. In order to obviate any inequities, in 1840 Jefferson Medical College introduced written examinations with secrecy of identity of the students. The questions were later published so that there could be no cavil concerning their fairness. In time the written examination superseded the oral examination

almost entirely. As for religion, there were never any religious restrictions imposed at Jefferson; students were only required to be of good moral character and repute, and upon graduation, take the Oath of Hippocrates.

Pioneer in American physiology, Dunglison is called the "Father of American Physiology." He was also an expert in the field of materia medica and served effectively for many years on the committee for the United States Pharmacopeia. He did not neglect the public welfare; his work for the insane poor and for the blind in Pennsylvania in this respect is particularly noteworthy. The most prolific medical author in this country, his writings, covering nearly every field of medicine except surgery, won for him world wide fame. A teacher of a host of young Americans for over forty years, his students acclaimed him everywhere. He was a member of many literary and scientific societies, and a friend and medical counsellor to four of our presidents and some of the other national figures of his time. His teaching, writing and social connections attracted great respect not only for him personally, but for the city he lived in, Philadelphia.

The Development of Bronchoscopy at Jefferson[1]

By JOHN J. O'KEEFE, M.D. [2]

BY THE time Dr. Chevalier Jackson brought bronchoscopy to Philadelphia it had already been developed into an effective and well recognized method of removing foreign bodies from the air-way. For while this transference didn't take place until 1916, Jackson's first bronchoscopy for foreign body removal had been performed in 1899, thereby providing factual evidence that his 17 year old brain-child had long since passed beyond its growing-pains stage and was by now well on its way to maturity.

Interestingly enough, considering the fact that all peroral endoscopy has been popularly referred to as bronchoscopy, bronchoscopy *per se* was the last of the peroral endoscopic techniques to be developed. Esophagoscopy and gastroscopy had been practiced since 1890 and specular laryngoscopy since 1895.—If nothing else, this little aside reflects the temper of this report, and as is so well exemplified in the parable of the coat and vest, while esophagoscopy labored hard and long to lay the ground work for all endoscopy, it was bronchoscopy, a "Johnny-come-lately," that reaped the reward.

His move from Pittsburgh to Philadelphia took place when Chevalier Jackson was 53 years old—even then appreciated as a rather advanced age for a man to embark on a new career—and it cannot be denied, the task of organizing an only-recently devised technical method into a recognized medical specialty, in a distant city, without benefit of precedent or of the experiences of others, constituted a new career in every sense of the term. Dr. Jackson's practice until now, even though the current incumbent of the Chair of Laryngology at the University of Pittsburgh, was far from being a remunerative one. In addition to the expenses incident to teaching, to travel, to the conduct of his practice and to the forever-mounting costs of instrument making, his financial burden was further encumbered with the obligations of raising and supporting a family. All the while, to defray these costs, his only recourse was to the income from a practice whose clientele consisted, for the most part, of the poor and destitute of Pittsburgh. Obviously, this mode of living had afforded him little chance of establishing any degree of financial security. And now, faced with the need for appraising his immediate future, he could but envision an appointment that carried no stipend, was not endowed, nor was it supported by a government grant. It is difficult for an ordinary person to understand, in view of the foregoing, why Chevalier Jackson accepted this appointment—but the fact remains, accept it he did. Time since then has proved that this man was not a fool; and whether or not he was a genius is not pertinent. But what is pertinent is: what motivated him?, what prompted Chevalier Jackson to move to Philadelphia in view of these almost insurmountable adversities?

A less dedicated man, encumbered with the multiplicity of problems such as those that plagued Dr. Jackson, would have been hard-set in deciding to accept the invitation offered by Jefferson Medical College. Dr. Jackson, however, apparently with little or no misgivings for having to relinquish his already established medical practice, nor for his physical frailty, and with only the least concern for his financial insecurity, accepted this appointment readily, and for no other reason than because it afforded him the opportunity to fulfill the mandate by which he felt himself charged

[1] Read before the Section on Medical History, The College of Physicians of Philadelphia, 8 December 1964.

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with teaching the gospel of bronchoesophagology, and in, of all desirable places, the Mecca of medical learning. Truly this, to Chevalier Jackson, was his golden opportunity to improve the lot of all mankind, and he was determined that nothing would stand in his way nor was there a hardship or a sacrifice he would not endure if it but fostered the teaching of his beloved bronchoscopy. This same attitude, this same character trait, this singleness of purpose, was repeatedly evidenced in his ensuing years, both in practice and in teaching. So herein then, lies the answer to Chevalier Jackson's motivation: whether known to him or not, (and I strongly suspect it was) Chevalier Jackson portrayed, or assumed, the role of a modern Don Quixote! No less an intimate than Dr. Ross V. Patterson, the Dean of Jefferson Medical College during Dr. Jackson's sojourn at Jefferson, attested to this interpretation—and more and more frequently, with mounting intolerance for his persistent impracticality.

In further support of this personality description, and in accordance with an unfailing practice of Chevalier Jackson's to sign, initial or otherwise identify all his works, several rather ancient bronchoscopes still reside in our clinic (though not currently in use), stamped "C. Q. J." So it seems that he was aware of being labeled with this pseudonym, even that he concurred with it—very likely though with "tongue in cheek."

Such was the personality and temperament of the man who initiated and was responsible for the early development of Broncho-esophagology at Jefferson Medical College. Parenthetically, it is noted that Dr. Jackson's appointment was that of Professor of Laryngology—and that it was not for eight years, from 1916 to 1924—that the Board of Trustees saw fit to establish a Chair of Broncho-esophagology in his honor, thereby and at last affording this new surgical specialty academic autonomy. Chevalier Jackson was the first of only two men to hold that Chair as a single appointment at Jefferson—for immediately prior to assuming it, he relinquished the Chair of Laryngology.

Broncho-esophagology, and all associated with it while under Chevalier Jackson's aegis, grew and prospered at Jefferson Medical College. Word of this Philadelphia doctor's "ability to perform the apparently impossible" rapidly spread throughout the world. And from 1916 to 1930 the names Jefferson and Jackson were synonymous. Referring physicians and their patients, or more accurately, the parents of these small patients, wrote of or related their hospital experiences, and visiting physicians and physicians-in-learning carried home with them newly acquired endoscopic technics learned at the clinic. And all contributed to the spread of bronchoscopy, both in name and in practice, throughout the medical world.

Chevalier Jackson labored incessantly, tirelessly, during these years, to establish bronchoscopy in its rightful place in the medical curriculum, speaking at every meeting to which he was invited, and there were many, always and forever teaching, writing for both the medical and the lay press, and all the while, as might be expected, conducting a tremendously active practice. His name and his reputation were soon known the world over. The honors showered on him were legion.

Of the many monumental objectives attained through his labors, one he was most proud of—and one that has ever since served great common good—was the enactment of the federal Caustic Act. Dr. Jackson's dedication to this cause truly was a labor of love, born of his compassion for the constant sucession of children admitted to his clinic suffering with lye burns of the esophagus. His campaign in championing this legislation extended over twenty years, and he was obliged to bear the entire cost of waging that campaign. Eventually, and only after having appeared before the United States Senate and the House of Representatives, to plead his cause, this Act was passed by Congress and signed as law by President Coolidge in March (2) 1927.

In a lesser way, and as one of the many

intangibles concerned in the growth of bronchoscopy, and as a sincere tribute to the physicians of Philadelphia who were then also endeavoring to practice Broncho-esophagology, on Dr. Jackson's coming to Philadelphia, almost to a man these doctors relinquished whatever claims they had on this type of work and most graciously referred their entire endoscopic practices to Dr. Jackson.

After 14 years of having served as Professor of first, Laryngology then Broncho-esophagology, and on having attained retirement age, 65 years, Chevalier Jackson submitted his resignation to the Board of Trustees at Jefferson Medical College. And regardless of their desire and willingness to extend his term, he was adamant in his decision. Rather than having retirement in mind, however, it was soon evident that Dr. Jackson's intentions were to move to Temple University Hospital, there to establish another Chevalier Jackson Bronchoscopic Clinic. It may be only coincidental that Chevalier Lawrence Jackson, his physician son, was then on the staff at Temple Hospital, beginning the practice of Broncho-esophagology, just as it may be only a truism that "blood is thicker than water." Whatever the relationship, if any, existing between or connecting these facts, this was the way in which Chevalier Jackson terminated his affiliation with Jefferson Medical College.

Mindful that clinical departments run poorly without capable direction, and in keeping with established policy, the Board of Trustees at Jefferson Medical College, through the office of Dean Patterson, began negotiations to fill the Chair of Broncho-esophagology—so recently vacated. In due process, or otherwise, but at any rate without the lapse of too much time, this appointment was bestowed on Louis Henry Clerf, one of Dr. Jackson's most promising pupils. As might be suspected however, the actual conferring of this honor represented the culmination of a war on nerves (so typical of all appointments) in which political, rather than military strategy was engaged in, using intrigue and innuendo as ammunition. And in true story book, happy-ending fashion, both sides emerged victorious! Dr. Clerf's recounting of this episode—which really plays such a vital part in the development of bronchoscopy at Jefferson—and in which he plays so well the part of the master story teller, is a classic. It seems that the Dean was "holding off" on relaying his decision to the Board, possibly because of the difficulties encountered in evaluating the qualifications of the several or many candidates being considered, or possibly because it was just the usual way in which these things were done. Dr. Clerf however, decided that a more positive course was called for and thus devised an imaginary contact with one of the Mid Western schools, which, naturally, was in dire need of his services: and by way of presenting this ultimatum informed Dr. Patterson that his bags were packed and that he planned on leaving Philadelphia the following week—unless, of course, the Board saw fit to make its appointment before then. To the everlasting credit of Broncho-esophagology and of Jefferson, the Board saw fit.

Louis H. Clerf came to Jefferson, or rather was sent to Jefferson by the U. S. Navy, in 1923, to study laryngology. In so doing he walked headlong into a situation that was made to order—or ordained—for him. Under Chevalier Jackson's tutelage and imbued with the same work habits, Dr. Clerf proved himself a most apt pupil. So much so that there was no question, when the time came, concerning his qualifications to take Dr. Jackson's place. And accordingly in 1930 Louis H. Clerf was appointed to the Chair of Broncho-esophagology at Jefferson Medical College.

His drive and his work potential were easily equal to those of his predecessor, but Dr. Clerf was further endowed by nature with a quality of person so different from Dr. Jackson: here was a man the essence of affability and friendliness and understanding—all so tersely paraphrased as "Jefferson's greatest ambassador of good will." And, here too it must be added, was Bronchoscopy's champion—for he carried this work to even higher acclaim than it had been afforded when he first began his stay in office. Dr. Clerf's motivation though, had

nothing to do with any form of complex—Don Quixote or otherwise. He freely and frequently admitted experiencing a sense of pride in seeing his name in print, but never as satisfaction to his ego. To some degree it appears that although Dr. Clerf took great satisfaction with the results of his work, his basic motivation was his love for work.

Somewhat precipitously, in the year 1937, the Chair of Laryngology, which had been relinquished by Dr. Jackson in favor of the Chair of Broncho-esophagology, was made vacant because of the unfortunate and premature illness of the incumbent, Dr. Fielding O. Lewis. On receiving and accepting this appointment Dr. Clerf ended the period and state of academic autonomy that had been afforded Broncho-esophagology as established by the Board of Trustees at Jefferson for Dr. Jackson. It was not then appreciated that this dual appointment would have any influence or reflection on the future of broncho-esophagology —but *de facto* that was the death knell of bronchoscopy's academic independence. And who is to say whether for the better or for the worse—

The teaching of Broncho-esophagology under Dr. Clerf took on a new meaning. He was never an advocate of the so-called "short-course" method of teaching as instituted by Dr. Jackson, and never engaged in it. It was his conviction rather, that Broncho-esophagology was properly a prerogative of the Otolaryngologist and that proper training in Broncho-esophagology should be incorporated in the teaching of Otolaryngology. Consequently, his residency training program designed with this principle in mind, has been eminently successful.

The development of Broncho-esophagology at Jefferson reached its height during the tenure of Dr. Clerf's professorship. He resigned on account of age in 1954.

Epilogue is the time for retrospection, for the "I knew it all the time" type of rationalization. True, bronchoscopy was born of necessity, but on being brought to Jefferson was reared and nurtured by a man of true dedication, a man of simplicity, yet a man of singleness and tenaciousness of purpose, a man whose abilities compare with genius. And although its continued growth and maturity may appear as a most natural progression of things, actually they too reflect the driving efforts of an equally dedicated person. Lesser personages who contributed seriously, if not equally, to the development of Broncho-esophagology at Jefferson are not forgotten in this report, but as unfairly as always, they must remain as such, unnamed. Its development has had an important and momentous impact on medicine, and there are those who even today hold it in esteem—none however, more so than the parents of the children who represent foreign body accidents. Its present is somewhat confused; its future is indeterminate.

Jefferson has done well, has prospered and grown fat, basking in the reflection of these two men, her sons, who have been most responsible for the development of Broncho-esophagology at Jefferson.

Memoir of Martin E. Rehfuss

1887-1964*

By W. PAUL HAVENS, Jr., M.D.

MARTIN E. REHFUSS, Attending Physician, Emeritus, at the Jefferson Hospital and Professor of Clinical Medicine, Emeritus, at the Jefferson Medical College, died at home after a long illness on July 29, 1964, at the age of seventy-six. Up to his demise, he read the contemporary literature of his field and was equally well acquainted with many aspects of current events. He delighted in discussing these subjects with his friends and colleagues, and indeed, during the several years of physical adversity that he endured, his intellectual vigor never waned.

Dr. Rehfuss was born August 8, 1887, in Philadelphia, Pa., the son of Martin O. Rehfuss, a distinguished inventor, and Louisa Allgaier Rehfuss. He was educated in the public schools, and in 1909 received his Doctorate in Medicine from the University of Pennsylvania School of Medicine. In 1921, he married Lettie Page Woods, who predeceased him on June 4, 1964.

From January, 1910, to July, 1911, he served his internship at the Hospital of the University of Pennsylvania, and then at the request of Dr. John H. Musser went to Paris as Resident Physician in the American Hospital where he served for two years. A third year was spent working in Berlin, Munich, and Vienna. During this period, he came under the influence of many of the great Continental scientists and clinicians and became interested in the study of diseases of the gastrointestinal tract. It is indeed of note that during this time he invented the Rehfuss tube and with it devised the technique of fractional estimation of the gastric contents. Thus, when he came back to the United States in 1914, he was equipped and ready to contribute fruitfully to the development of what was to be the scientific basis for contemporary gastroenterology.

Dr. Musser had died during his absence, and on his return in 1914 Dr. Rehfuss was appointed to the Medical Staff of the Jefferson Hospital and joined the faculty of the Jefferson Medical College where began his productive association with Dr. Philip B. Hawk, Professor of Biochemistry. For several years, meticulous pioneer studies on the digestion of food in normal and abnormal human stomachs were carried out in a rapidly growing academic background dominated by such men as Dr. Thomas McCrae, Dr. Chevalier Jackson, and Dr. John H. Gibbon. The results of these and subsequent studies of diseases of the biliary tract were published in several textbooks and in more than two hundred articles that appeared over the years in medical journals.

At the Jefferson Medical College, Dr. Rehfuss served as Instructor in Medicine, 1914–1918; Associate in Medicine, 1918–1927; Assistant Professor of Medicine, 1927–1929; Associate Professor of Medicine, 1929–1933; Clinical Professor of Medicine, 1933–1936; Professor of Clinical Medicine, 1936–1952; and Professor of Clinical Medicine, Emeritus, from 1952 until his death. The Jefferson Medical College conferred on him the honorary degree of Doctor of Laws in 1954.

He was a member or officer of many medical societies, and the following partially completed list attests to the breadth of his interests: the American College of Physicians, the Philadelphia College of Physicians, the American Gastroenterological Association, the Philadelphia County Medical Society, the Pennsyl-

* Read before The College of Physicians of Philadelphia, 3 February 1965. Prepared and published at the request of the Council of The College of Physicians of Philadelphia.

vania State Medical Society, the American Medical Association, and the Hollywood Academy of Medicine. He was Chairman of the Joint Committee on Gastroenterology of the American Medical Association and the American Gastroenterological Association during World War I, and served as Captain in the United States Army.

Although Dr. Rehfuss remained active in research and teaching, the transition from clinical investigation to clinical practice gradually became evident. As the years went by, he was doubtless best known for his clinical skill that combined, in a strange alchemy of human capabilities, just the right proportions of art and science. Both intellectually and physically he brought a meticulous elegance to the bedside, and rode the crest of the wave of development of internal medicine in our country. A clinician with few peers, he was astute, intuitive, and resourceful. He cared for the famous, the rich, and the poor, and they all found in him what they sought. His energetic enthusiasm never flagged, and the problem of every patient was an intensely personal one to him. Long after he retired from active practice, his opinion and advice were sought by many for whom he had cared over the years. It was his genius to encompass in his career achievement in research, excellence in teaching, and wisdom and kindliness in the care of patients.

Memoir of Frederick H. Allen

1890-1964*

By LAUREN H. SMITH, M.D.

DR. FREDERICK H. ALLEN, former Director of the Philadelphia Child Guidance Clinic and recognized Dean of American Child Psychiatry, was born on December 6, 1890, in San Jose, California, and passed away at Philadelphia on January 15, 1964.

A Westerner by birth, education, and family association, he was graduated from the University of California with an M.A. in Psychology in 1916. With this broad background he graduated in medicine at The Johns Hopkins University in 1921, then served as resident psychiatrist at Phipps Clinic in Baltimore from 1921 to 1925, where interest in family and community psychiatry, especially in child psychiatry, established the foundation of a brilliant professional career.

A capacity for leadership and excellent personal performance was evidenced in college years by his election to Alpha Omega Alpha, and by his winning first place in the running broad jumps in the Olympic tryouts of 1911. In 1912, at Stockholm, Sweden, as a member of the United States Teams competing in the Olympic games, he ranked fifth among eighty competitors. In 1922 he married Madell Gille, from Seattle, Washington, who survives him. After completing four years experience at Phipps Clinic in 1925, he was selected as the first Director of the All-Philadelphia Child Guidance Clinic. Here originated the first fellowships for training in Child Psychiatry, funded by the Commonwealth Fund and co-sponsored by the University of Pennsylvania Graduate School of Medicine and the Pennsylvania Hospital. There were eight Fellows in training on these original fellowships under Dr. Allen's direction. This program became the model for extensive training programs which are now widespread in the psychiatric field. A leadership role from this time on throughout his entire professional career never was dormant, but grew and flourished with the same qualities which characterized what he developed as principles of therapy with children. As a teacher he developed training programs at the Clinic and also participated in the instruction of medical students and students from the fields of education, social work, and psychology. He aided many national organizations in establishing criteria for examinations and procedures related to both didactic instruction and clinical application of psychiatric therapy. As a result high standards were established, not merely followed, by him.

Many new medical and psychiatric organizations appeared in this new field of child psychiatry. He became President of most of these, and in fact was the first President of the American Association of Psychiatric Clinics for Children, as well as being the first Chairman of the Board for Certification in Child Psychiatry, a sub-specialty of the American Board of Psychiatry and Neurology. An ability to be an innovator and to sustain it was recognized frequently, especially by the citizens of Philadelphia where he received The Philadelphia (Bok) Award for Public Service in 1950. He was awarded Honorary LL.D. from his *Alma Mater*, the University of California in 1953, and the Marriage Council Special Award in 1963. In his later professional years he was Professor of Psychiatry, University of Pennsylvania School of Medicine, Neuropsychiatric Consultant of the Veterans Ad-

* Read before The College of Physicians of Philadelphia, 7 October 1964. Prepared and published at the request of the Council of The College of Physicians of Philadelphia.

ministration, and Psychiatric Consultant to the Philadelphia Board of Education.

The many papers from his pen, not only for the medical profession but also for the community, naturally centered on children. They were impressive by being several score in number, but even more so in their quality. Throughout these writings the emphasis remained on the differences in individuals, the dignity of the individual, and they pointed out ways and means to achieve practical application of the personal role of responsibility in treatment for both adults and children. In two books, the first, "Psychotherapy with Children", and the second, "Positive Aspects of Child Psychiatry", which was published as late as 1963, emphasis centered on helping the child grow and become a person in his own right. As described in the review descriptions of these books it was pointed out that, "the entire course of Child Psychiatry has developed out of his concept of human growth as a positive process, the result of the interaction of both biological and social forces . . . , with constant emphasis on the healthy rather than the weak part of the ego." Therapy was based on working toward health rather than toward illness. He placed child psychiatry in a good relationship to medicine, to education, social work, and the child's cultural and family milieu. The last of his two books was dedicated to the Alumni Association of the Philadelphia Child Guidance Clinic, a group made up, as he stated, of fifty-five psychiatrists and psychologists who trained at the Clinic—most of them under his direction. Beyond this there were many other professional and lay people who felt his influence in their life work.

A warm relationship was maintained throughout his full life with many friends, both locally and nationally, with whom he shared enjoyable interests in social events, athletics, horticulture and travel. Elected a Fellow of The College of Physicians of Philadelphia in 1932, he shared in its activities for over thirty years.

His thoughts, his attitudes, his standards, his skills, live on now in the productive activities of those he taught, who are now working in their several professions everywhere in the world. To them, to his many friends, and to the parents and countless children who knew him well and owe him so much, he will always remain a man cheerful in heart and manner, forever young, who continues as a happy moving spirit in their minds and work.

Memoir of Thomas Fitz-Hugh, Jr.

1894-1963*

By I. S. RAVDIN, M.D.

DR. THOMAS FITZ-HUGH, JR. was born on December 1, 1894, in Baltimore, Maryland, the son of Thomas and Katharine (Lefevre) Fitz-Hugh. He earned an A.B. degree from the University of Virginia in 1915 and an A.M. degree in 1917. He received his Doctorate in Medicine from the University of Pennsylvania in 1921. He interned at the Hospital of the University of Pennsylvania and, subsequent to this training, became an assistant to the distinguished internist Dr. David Riesman. Dr. Fitz-Hugh became an Instructor in Medicine at the University of Pennsylvania School of Medicine and Hospital in 1923, and Chief of the Hematology Section in 1929. He became an Associate in Medicine in 1931, an Associate Professor of Clinical Medicine in 1933, and a Professor of Clinical Medicine in 1947.

Dr. Fitz-Hugh was a member of many distinguished medical organizations. Among them were the International Society of Hematology and the American Society of Hematology, the American Society for Clinical Investigation, the American College of Physicians, and the Association of American Physicians. He was a member of Phi Beta Kappa, Sigma Xi, and Alpha Omega Alpha Honor Societies. Elected a Fellow of the College of Physicians of Philadelphia in 1928, he served as editor of its *Transactions* in 1937 and was a member of the Committee on Publication from 1937–40.

In World War I he served as a Private, Medical Corps, with the AEF Base Hospital Number 41, St. Denis, France, 1918–19. During World War II he was commissioned a Lieutenant Colonel in 1940, became Chief of the Medical Service of the Twentieth General Hospital in May, 1942, and kept this post until 1943. On returning to this country, he was made Chief of the Medical Service at The McGuire General Hospital in Richmond, Virginia, and later, Medical Consultant, 3rd Service Command in May, 1944. He was promoted to the grade of Colonel on July 25, 1944. His interest in the Military continued and he became a Staff Consultant, Internist, to the Second Army in 1955. He was author of many papers in the field of hematology and contributed chapters to several medical textbooks.

Dr. Fitz-Hugh was truly a doctor's doctor. A distinguished hematologist, he was also a medical consultant to Delaware County Hospital and the Children's Hospital of Philadelphia. He was the first internist appointed to the James IV Society of Surgeons, in which international organization he was made an honorary member in 1960.

In 1925, Dr. Fitz-Hugh married Anne Will, who died in 1939. A daughter, Maryann Harris Fitz-Hugh, was born to them. In 1945 he married Bernice Rowe. From this marriage, two daughters were born. Dr. Fitz-Hugh died in Philadelphia on September 26, 1963. A distinguished colleague and an outstanding physician, he will be missed by members of the medical profession, as well as by the many patients he cared for so well.

* * *

The following remarks concerning the illustrious career of Dr. Fitz-Hugh were added to the above Memoir by Dr. Francis C. Wood, Vice-President of the College, who read the Memoir prepared by Dr. Ravdin.

* Read before the College of Physicians of Philadelphia, 4 November 1964. Prepared and published at the request of the Council of The College of Physicians of Philadelphia.

Mr. President, if you will permit me to do so I should like to add a few remarks of my own.

Thomas Fitz-Hugh was a Southern gentleman of distinguished lineage, with all that this implies. He was my older brother in medicine when I finished my internship and started to teach. I learned many things from him, among them that it was not so easy to make the correct diagnosis as you might think it would be, when you watched *him* in action studying a patient. He had as brilliant a mind as any man I have ever known. It functioned like a large perfectly oiled machine. It turned over quietly, unhurriedly, and unerringly.

He had a large and very busy practice. Yet, in his study of patients he was always alert to some underlying factor which had not yet been discovered. In May of 1931 he examined the bone marrow of a woman who had died of agranulocytic angina. In January, 1932, he published his article "Myeloid Cell Hyperplasia of the Bone Marrow in Agranulocytic Angina" (1), in which he proposed a "maturation arrest" as opposed to the widely held hypothesis of "granulocytic aplasia" as the cause of this puzzling lethal disease. He believed the etiology might be analogous to the red cell maturation arrest in pernicious anemia, and suggested the name "pernicious leukopenia." His original observation was made three years before Madison and Squier discovered that the cause of this maturation arrest was aminopyrine.

Another of his astute clinical deductions contributed to the delineation of the "Curtis-Fitz-Hugh Syndrome." In November of 1933 he had a patient who was thought to have acute cholecystitis. She was operated on after an interval of ten days, and a normal gallbladder was found. In Dr. Fitz-Hugh's paper "Acute Gonococcic Peritonitis of the Right Upper Quadrant in Women" (2), he describes the situation: "An unusual, localized fairly dry peritonitis involved the anterior surface and edge of the liver and the adjacent peritoneal surface of the diaphragm and the anterior wall. The peritoneum in these areas was injected and had the appearance of salt sprinkled on a moist surface. . . . After cogitating overnight we decided that what we had seen was probably the acute stage of the process described in its chronic form by Curtis. Accordingly, smears were made from the drainage tract and we were promptly rewarded with the finding of a beautiful spread of typical gram-negative intracellular biscuit-shaped diplococci."

A few weeks before he died, I had a visit with him, during which he told me about one of his teachers at the University of Virginia, who is memorialized by this inscription on the wall of one of its buildings. The inscription reads:

William Harding Echols
1859–1934
Professor of Mathematics

By precept and example he taught many generations of students with ruthless insistence that the supreme values are:
Self-respect
Integrity of Mind
Contempt of Fear and
Hatred of Sham

Those of us who knew Thomas Fitz-Hugh intimately, know that these supreme values could not have characterized William Harding Echols more perfectly than they did Thomas Fitz-Hugh, Jr.

REFERENCES

(1) Fitz-Hugh, T., Jr., and Krumbhaar, E. B.: Myeloid Cell Hyperplasia of the Bone Marrow in Agranulocytic Angina. American Journal of the Medical Sciences **183:** 104, January 1932.

(2) Fi z-Hugh, T., Jr.: Acute Gonococcic Peritonitis of the Right Upper Quadrant in Women. Journal of the American Medical Association **102:** 2094, June 23, 1934.

Memoir of Philip H. W. Geisler

1925-1964*

By F. WILLIAM SUNDERMAN, Jr., M.D.

DR. PHILIP HOWARD WIRT GEISLER, Assistant Professor of Pathology at the Jefferson Medical College of Philadelphia, died in an airliner crash on July 9, 1964, at age 39. Doctor Geisler was enroute to a hematology meeting at the University of Tennessee, where he was scheduled to deliver a paper on the subject of platelet preservation.

Doctor Geisler was born in Philadelphia on June 15, 1925, the child of Dr. Howard D. and Eleanor Wirt Geisler. His father, Dr. Howard D. Geisler was a prominent practitioner of internal medicine, who died while the son was still a young boy. Dr. Philip Geisler was reared by his mother, a gracious and cultured lady whose human qualities and intellectual pursuits exerted a profound influence upon the development of her son's character. His boyhood years were spent in Philadelphia, where he attended the Germantown Friends' School, and in Somerset, England, where he attended the Wells Cathedral School.

In 1943, at age 18, Philip Geisler enlisted in the United States Army, where he served as a laboratory technologist in the European theater of operations. The interest in laboratory medicine which was engendered by this military service helped to guide his choice of a career. Boyhood and wartime contacts with the cultures of Great Britain and France stimulated continuing avocational interests in the literature and history of these countries.

At the conclusion of the war, in 1946, Philip Geisler enrolled in the pre-medical curriculum at Union College in Schenectady, New York. After two years, he transferred his pre-medical studies to Lehigh University in Bethlehem, Pennsylvania. There he was a member of Theta Delta Chi Fraternity and Alpha Epsilon Delta Pre-Medical Honor Society. Vacation periods during undergraduate years were devoted to the study of French at McGill University in Montreal and at the University of Grenoble in France. Following graduation from Lehigh University in 1950, he remained at his *alma mater* during the academic year 1950–51 as an Instructor in Biology.

In 1951, Philip Geisler began the study of medicine at Jefferson Medical College. At Jefferson, he was a member of Theta Kappa Psi Medical Fraternity and the Hare Medical Society. He graduated from Jefferson with academic distinction in 1955 and then served for one year as an intern at the United States Public Health Service Hospital on Staten Island, New York. In 1956, Doctor Geisler joined the staff of the National Institutes of Health at Bethesda, Maryland, where he was a Resident in Anatomic Pathology from 1956 to 1958 and a Resident in Clinical Pathology from 1958 to 1960. Doctor Geisler remained at the National Institutes of Health from 1960 to 1961 as Assistant Pathologist in the Department of Clinical Pathology.

In 1961, Doctor Geisler joined the faculty of Jefferson Medical College as Assistant Professor of Pathology, Associate Member of the Cardeza Foundation for Hematological Research, and Director of the Hemophilia Service at Jefferson Hospital. In these capacities, he worked closely with his esteemed professor, the late Dr. Leandro M. Tocantins.

Doctor Geisler was a Diplomate in Clinical

* Dr. Geisler was elected a Fellow of The College of Physicians of Philadelphia on 20 May 1964. He participated in the activities of the Section on General Medicine. This memorial, published with the accord of the Council of the College, records the affection and esteem with which he was held by its membership.

Pathology of the American Board of Pathology and a member of numerous medical and scientific societies, including the Association of Clinical Scientists, the College of American Pathologists, the American Society for Experimental Pathology, the International Society of Hematology, the American Association for the Advancement of Science, the Society of the Sigma Xi, the National Hemophilia Foundation, The College of Physicians of Philadelphia, and the Philadelphia Pathological Society. Doctor Geisler was especially prominent in the activities of the Association of Clinical Scientists, having served on the Faculty of four Applied Seminars of the Association, and having presented scientific papers at many meetings of the Association.

Doctor Geisler's scientific contributions include nineteen papers, which were principally in the field of hematology. His most significant investigations included the development of methods for the measurement of platelet antibodies, the development of techniques for the preservation of platelets in the frozen state, and studies of the anti-hemophilic globulins. The years from 1962 to 1964 were the most productive period of Doctor Geisler's scientific career, and, at the time of his sudden death, he was involved in the characterization of platelet enzymes and in studies of the coagulation defects in canine hemophilia.

Doctor Geisler was a stimulating teacher, beloved by his colleagues and students at Jefferson Medical College. His approach to teaching was practical, patient and good-natured. His students were inspired by his enthusiastic discussions of the clinical interpretations of laboratory data. Colleagues were gratified by his willingness to collaborate in clinical investigations, and by his ready fund of scientific information.

A devoted son, Doctor Geisler helped unselfishly and indefatigably in caring for his mother throughout a protracted illness, and he was deeply saddened by her death only six months before his own.

In 1963, Doctor Geisler was married to Miss Priscilla Farley of Ackworth, New Hampshire. A loving and considerate husband, he shared with his charming wife the enjoyment of literature, philosophy and the theater; the relaxation of ice-skating, boating, bicycling and nature-study; and the conviviality of parties and dancing. The Geisler's home was filled with happiness and hospitality.

Considering his brief career, few men have contributed more than Dr. Philip H. W. Geisler to the science of clinical pathology. He was admired and respected by all his fellow workers, and his untimely death constitutes an immeasurable loss to his family, friends, colleagues and students.

Report of the Secretary for the Year Ended December 29, 1964

		(Attendance)
Stated Scientific Meetings:		
January	The Fifth Hira S. Chouké Lecture Walter B. Shelley, M.D.	152
February	The Eighty-sixth Mary Scott Newbold Lecture David M. Hume, M.D.	176
March	The Seventy-sixth Thomas Dent Mütter Lecture Lauren V. Ackerman, M.D.	176
April	The Eighty-seventh Mary Scott Newbold Lecture Robert A. Good, M.D.	162
May	At the Philadelphia County Medical Society: Presentation of the Strittmatter Award to Bernard P. Widmann, M.D., by George Willauer, M.D. Presentation of Certificates to Physicians who have completed fifty years in the practice of medicine, by Wilbur E. Flannery, M.D., President, Pennsylvania Medical Society.	
October	The Seventeenth S. Weir Mitchell Oration Roland P. Mackay, M.D.	125
November	Joint Meeting with the Philadelphia County Medical Society. The Eighty-eighth Mary Scott Newbold Lecture John E. Deitrick, M.D.	50
December	The Twenty-Fourth Alvarenga Lecture Christian J. Lambertsen, M.D.	78

	(Total Ballot)
Regular Business Meetings:	
January 8, 1964	272
February 5, 1964	276
March 4, 1964	262
April 1, 1964	265
May 20, 1964	275
November 4, 1964	273
December 2, 1964	275
	(Ballot for Amendment)
February 5, 1964	304
November 4, 1964	259

The College of Physicians of Philadelphia awarded the Alvarenga Prize Award on July 14, 1964, to Christian J. Lambertsen, M.D., for his outstanding work on Hyperbaric Oxygenation.

	(Membership)
Sections of the College:	
Ophthalmology	78
Otolaryngology	52 & 4 Honorary

General Medicine	145
Public Health, Preventive & Industrial Medicine	76
Medical History	132

Membership:

	Fellow	Non-Res.	Assoc.	Honorary		Hon. Assoc.	Total
				Foreign	U. S.		
December 17, 1963	1091	138	0	3	4	2	1238
Died during year	17	2					19
Resigned	21						21
Elected	52	3			1	1	57
Transferred from Resident to Non-Resident	−17	+17					
Transferred from non-Resident to Resident	+1	−1					
Failed to qualify	1						1
Forfeited	3	2					5
December 29, 1964	1085	153	0	3	5	3	1249
Life Membership							
New Type							
Under 70	22	6					
Over 70	29	8					
Old Type (commutation dues)	7						
	58	14					
Dues Remitted							
Before 1964	37	7					
During 1964	17	2					
	54	9					
Annual Contributors as of December 29, 1964	973	130					

WILLIAM A. STEIGER, M.D.
Secretary

Report of the Treasurer for the Period November 11, 1963 to June 30, 1964*

ASSETS

General Fund:			
Cash in bank			$5,054.09
Maintenance and Reserve Fund:			
Cash in bank		$905.72	
Investments		35,194.70	
			36,100.42
Joseph N. Pew, Jr., Memorial Loan Fund:			
Cash in bank		1,000.00	
Investments		27,602.19	
Notes receivable		6,400.00	
			35,002.19
Library Historical Collections Fund:			
Cash in bank—overexpended			(77.65)
Special Contributions for Use of the Library:			
Cash in bank—overexpended			(9.75)
Trust Funds:			
Uninvested principal cash		24,918.17	
Uninvested income cash (restricted)		12,676.29	
Mortgage		32,625.00	
Real estate		158,905.33	
Bonds		407,718.40	
Preferred stocks		280,582.17	
Common stocks		434,915.52	
			1,352,340.88
Plant Fund:			
Land—16–25 South 22nd Street		95,000.00	
Building		1,420,747.93	
Furniture and fixtures		1.00	
Deposits on perpetual fire insurance policies		11,462.28	
			1,527,211.21
			$2,955,623.39

FUNDS

General Fund:			
Library general account		$22,278.48	
Library medical documentation service		536.06	
Reserve for contingencies—uninvested funds		190.02	
Greater Philadelphia Committee for Medical-Pharmaceutical Science		5,241.67	
Unexpended operating fund balances:			
Current operations—Overexpended	($23,766.62)		
Committee on Interns and Residents	717.89		
President's room	525.00		
Books	(798.65)		
Rare books	100.00		
Campaign expense	105.95		
Portrait	126.47		
Harvey's "De Motu Cordis" Facsimile	(202.18)		
		(23,192.14)	
			$5,054.09

* Fiscal year has been changed to end June 30.

Maintenance and Reserve Fund—principal			36,100.42
Joseph N. Pew, Jr., Memorial Loan Fund—principal			35,002.19
Library Historical Collections Fund—principal			(77.65)
Special Contributions for Use of the Library—principal			(9.75)
Trust Funds:			
Principal net worth			
Discretionary common trust fund	1,267,963.39		
Legal common trust fund	24,097.94		
Trust funds net pooled	14,978.26		
Fund for purchase of units in discretionary common trust fund	32,625.00	1,339,664.59	
Income net worth			
Discretionary common trust fund	9,482.07		
Legal common trust fund	1,047.89		
Trust fund net pooled	2,146.33	12,676.29	
			1,352,340.88
			1,428,410.18
Plant Fund—principal net worth			1,527,211.21
			$2,955,621.39

NOTES: The various fund investments are shown at their recorded values, which values substantially represent cost.

GENERAL FUND

STATEMENT OF CASH RECEIPTS AND DISBURSEMENTS

November 11, 1963 to June 30, 1964

Receipts:				
Income on investments, net of agent's fees:				
Trust funds		$45,581.82		
Less:				
Amount transferred to income of the several restricted trust funds	$7,076.59			
Erlanger Garage expenses paid	4,279.48			
		11,356.07		
		34,225.75		
Add: Income transferred from Erlanger Garage to DCTF in excess of profits earned by garage		3,451.72	37,677.47	
Income from funds, principal of which is not administered by College		1,004.18		
Less, amount transferred to income of a restricted fund		379.58	624.60	
Interest on mortgage		753.03		
Income from J. N. Pew, Jr., Memorial Fund		1,152.87	1,905.90	$40,207.97
Contributions:				
Fellows dues			78,657.50	
Life membership			1,159.00	
Use of hall and projector, including Ghana Project			2,243.00	
For Greater Philadelphia Committee for Medical-Pharmaceutical Science			1,000.00	83,059.50
Transfers from other funds:				
For reducing deficit in current operating account:				
Miscellaneous Contributions Fund			5,924.30	
For covering deficit of Entertainment Committee:				
S. Weir Mitchell Entertainment Fund			635.68	6,559.98

Library:			
Contribution plan	12,193.00		
Photostats, fines, etc.	42,612.82	54,805.82	
Medical documentation service		18,747.39	73,553.21
Miscellaneous			2,018.50
Total receipts			205,399.16
Disbursements:			
Operating expenses:			
Hall Committee		$30,668.99	
Office of the Secretary		5,822.78	
Office of the Treasurer		6,540.98	
Pensions		3,156.28	
Campaign expenses		10.00	
Publication Committee		8,453.59	
Books		2,501.72	
Entertainment Committee		1,965.43	
College Collections Committee		2,571.03	
Traveling expenses—Mütter Museum		181.42	
Library:			
Salaries	$65,955.42		
Books, journals, supplies, etc.	32,166.52	98,121.94	
Medical documentation:			
Salaries	13,976.51		
Other expenses	4,234.82	18,211.33	
General funds used to purchase units in Discretionary Common Trust Fund for Pension Reserve Fund		686.36	
Greater Philadelphia Committee for Medical-Pharmaceutical Sciences		4,150.59	
			$183,042.44
Excess of receipts over disbursements			22,356.72
Cash balance, November 11, 1963			(17,302.63)
Cash balance, June 30, 1964			$5,054.09

STATEMENT OF COST OF INVESTMENT UNITS PURCHASED IN THE VARIOUS TRUST FUNDS BY THE RESTRICTED ENDOWMENT FUNDS

November 12, 1963 to July 1, 1964

Discretionary Common Trust Fund		
Balance, November 12, 1963		$669,347.24
Receipts:		
S. Weir Mitchell Associates journal fund	$17,155.86	
Theodore F. Bach Memorial Fund	10,000.00	
Pension Reserve Fund	1,082.68	
Arthur P. Hitchens Lecture Fund	500.00	
Transfers from unit adjustment account:		
S. Weir Mitchell Associates journal fund	21.37	
Theodore F. Bach Memorial Fund	21.37	
Pension Reserve Fund	21.37	
Friends of George Pfahler	21.37	
Laura Lane Library Fund	21.37	
Paul J. Sartain Library Fund	21.37	
Robert Abbe Custodianship Fund	21.37	
	28,888.13	

Less: Amounts insufficient to purchase one unit, credited to unit adjustment account	60.00	
		28,828.13
Balance, July 1, 1964		698,175.37
Legal Common Trust Fund		
Balance, July 1, 1964 (no change during period)		23,500.00
Trust Funds Not Pooled		
Balance, July 1, 1964 (no change during period)		14,974.56
Total restricted endowment funds, July 1, 1964		$736,649.93

STATEMENT OF COST OF INVESTMENT UNITS PURCHASED IN DISCRETIONARY COMMON TRUST FUND BY THE GENERAL ENDOWMENT FUND

November 12, 1963 to July 1, 1964

Balance, November 12, 1963		$423,843.32
Receipts:		
Entrance contributions	$3,050.00	
Voluntary contributions from Fellows, etc.	613.25	
Book of Remembrance	73.00	
Amortization of mortgage—13th and Locust Streets	1,125.00	
Transfer from unit adjustment account	21.37	
	4,882.62	
Less: Amount insufficient to purchase one unit, credited to unit adjustment account	10.26	4,872.36
Balance, July 1, 1964		$428,715.68

BY THE COLLEGE EXTENSION FUND

November 12, 1963 to July 1, 1964

Balance, November 12, 1963		$3,704.27
Receipts:		
Voluntary contributions from Fellows	$147.00	
Income earned on invested principal	104.59	
Transfer from unit adjustment account	21.37	
	272.96	
Less: Amount insufficient to purchase one unit, credited to unit adjustment account	16.52	
		256.44
Balance, July 1, 1964		$3,960.71
Total of all restricted funds, July 1, 1964		$1,169,326.32

KENDALL A. ELSOM, M.D.
Treasurer

Annual Report on the Library*

Administrative

The Ebb Tide. The 1959–60 Report of this Library bemoaned the fact that "There has been no recognition on the part of federal fund granting agencies that The College of Physicians Library is an essential resource for the medical research projects which government funds are sponsoring. The regional medical library in a non-teaching educational institution remains unrecognized by federal grant conferring agencies" (1). Today the College Library continues to subsidize federal agencies by free interlibrary loan and to service federal grant and contract holders who give token or no financial support to the Library.

Despite this lack of tangible appreciation, the College Library recognizes a social obligation to foster the communication of medical information. However, its ability to achieve maximum effectiveness is as impaired as it was when the 1953–54 Annual Report declared that crucial limitations of budget, personnel and space make the Library unable to adequately fulfill its regional responsibility. Other voices indicate that the College Library is not alone in this despair. The December 1964 Report of The President's Commission on Heart Disease, Cancer and Stroke protests that "The present state of most medical libraries in the United States is lamentable—largely because libraries have not received their due share of the greatly increased attention and funding for research. The Commission feels strongly that unless major attention is directed to improvement of our national medical library base, the continued and accelerated generation of scientific knowledge will become increasingly an exercise in futility" (2).

The Tide Turns. A similarly captioned paragraph in last year's Annual Report drew encouragement from the Scott Adams (3) and Harold Bloomquist (4) reports of 1962 and the meetings of representatives of regional libraries held at Harvard and Bethesda in February and April 1963. These meetings were inspired by a growing recognition on the part of federal agencies of the vital link provided by these libraries in the chain of bio-medical communication.

Philadelphia Response. The five Philadelphia medical school deans took to heart the warning voiced by Scott Adams at the 1962 meeting of the Association of American Medical Colleges. Philadelphia medical school librarians, meeting with the Librarian of the College of Physicians in November 1962 accepted the invitation of the Philadelphia Deans to assess the applicability of the Adams and Bloomquist reports to the local scene. This group categorically emphasized the urgency for action both to strengthen the individual school libraries and to underpin the capacity of the College of Physicians to render regional service.

The Librarian of the College went to the February 1963 regional meeting at Harvard forearmed with a statement of Philadelphia's regional accomplishments and desperate needs which had been endorsed by the local medical school librarians. This statement was later revised and approved by the Philadelphia Regional Group of the Medical Library Association on February 13, 1964 prior to its publication together with other regional statements in the July 1964 issue of the *Bulletin of the Medical Library Association* (5).

Philadelphia Regional Medical Library Committee. Perhaps the most significant concurrent development stemmed from the conviction of Dr. Marion S. Fay, President and Dean of the Woman's Medical College of Pennsylvania, that the College of Physicians should appoint a committee to formulate a plan for joint action. In October 1963, Dr. William F. Kellow, Chairman of the Deans' committee, formally requested the President of the College of Physicians to appoint an interlibrary medical organization to seek means of establishing cer-

*November 1, 1963—October 31, 1964.

tain central facilities which could be shared by the five medical schools of Philadelphia and also other medical organizations. This Committee was established and held its first meeting on February 3, 1964 at which time it fashioned the following statement of purpose, "The Committee interprets this directive (see above) to authorize the broadest possible exploration of means of improving Philadelphia medical library service through cooperative action . . . It is presumed that the Committee may consult other medical organizations such as hospitals, pharmaceutical companies, research institutes, and government agencies. The Committee may recommend the endorsement by the Deans' Committee of grant applications made by the College for support of expanded facilities or services.

"Types of expansion that are foreseeable at this time are: cooperative storage of little used materials, cooperatively supported messenger services, improvement of communication between libraries by teletype and facsimile transmission, provision of computer facility to extract bibliographic information from MEDLARS (National Library of Medicine) magnetic tapes, cooperative expansion of medical journal coverage to provide copies of all *Index Medicus* journals in the Philadelphia area, selective acquisition of journals in the peripheral and interdisciplinary sciences, intensified acquisition of reference tools, dissertations, research monographs, and encyclopedic systems, widening availability of scanning and reporting services to local grant holders, research departments and health foundations. The Committee recognizes a responsibility to keep itself informed of national developments affecting regional libraries and to initiate or recommend activity which will coordinate Philadelphia service within any national framework" (16).

At its second meeting, held on March 17th, the Committee concentrated on the factors involved in a College of Physicians-based cooperatively supported messenger service to facilitate interlibrary loans. A questionnaire was formulated to determine the potential usefulness of such a service. The response to this inquiry was essentially negative and further action was postponed. At this same meeting the Committee decided to broaden its representation by inviting Miss Jacqueline Bastille, Librarian of Smith Kline and French and Mrs. Helen Lake, Librarian of the Philadelphia General Hospital to join the Committee.

The third and fourth meetings of the Committee held on April 28th and September 29th studied plans for new medical school libraries at Temple University and the University of Pennsylvania. The Committee was joined for these sessions by the medical school librarians.

Intervisitation. The more favorable climate of regional and national appreciation of mutual problems was enhanced by an exchange of visits between the College of Physicians and the National Library of Medicine. Richard A. Kern, M.D., the Honorary Librarian, was accompanied by Leroy E. Burney, M.D. on a visit to the National Institutes of Health and the National Library of Medicine in February 1964. They were given an opportunity to present the needs of regional medical libraries as demonstrated by the College of Physicians. From this meeting developed an opportunity to discuss possible translation of these needs into legislative terms. In April, Martin M. Cummings, M.D., Director of the National Library of Medicine, returned this visit to the College and afforded the College Library an opportunity to demonstrate its regional services to the local and national community in supplementation of the extramural service offered by the National Library of Medicine. In July, Marjorie P. Wilson, M.D., Associate Director for Extramural Programs and Carl D. Douglass, PH.D., Chief, Research and Training Division Extramural Programs of the National Library of Medicine, reinforced the understanding developed by the previous visits by a tour of inspection.

Extramural Support. The May/June 1964 issue of the Library's Selected List of Publications Added to the Library suggested that it would be helpful to the Director of the National Library of Medicine to receive ex-

pressions of support of the proposed Extramural Program of the National Library of Medicine to give grants-in-aid to regional libraries which are supplementing national service to medicine. Twenty six persons supplied the Library with copies of letters which they directed to Dr. Cummings. These letters were most impressive by their individualistic approaches and by the variety of library users represented. Letters from Philadelphia, Harrisburg and Chicago reflected interest of the Philadelphia County Medical Society, state officials and the American Medical Association. Letters from as far away as Portsmouth, New Hampshire and Schenectady provided encouraging evidence of the widespread reservoir of good will which has been earned by the College's liberal lending policies.

Restrained Optimism. Although the tide has turned and understanding of regional library problems has deepened, federal interest seems to be mainly directed to medical schools which are serving a regional function; and the regional library which is not based on a university campus may continue to be the poor cousin whose complaints are more a source of embarrassment than concern.

The October 28, 1964 issue of *Drug Research Reports* commenting on a paper delivered by Dr. Marjorie P. Wilson at the meeting of the Association of American Medical Colleges in October 1964, notes that "NLM'S six-to-eight regional libraries will be built in or near medical schools. Part of the reason for this was detailed by NLM: 'Training is best accomplished in the academic setting where facilities of the university as a whole are available to contribute faculty expertise in modern librarianship, engineering, systems analysis, science and management to formulate an extensive interdisciplinary approach to training'."

Although our optimism is tempered, we still hope that the example of an independent medical association freely serving local medical schools and other research and training institutions will be recognized as an essential part of the literature network.

Journal Acquisition Program. Stimulated by an expression of interest by Frank Berger, M.D., President of Wallace Laboratories, the Library Administration prepared a budget proposal for the enlargement of the library's list of journals currently received. Donations for the project were received from Wallace Laboratories, Smith Kline & French Foundation, Merck Company Foundation, McNeil Laboratories, Campbell Soup Company, Norwich Pharmacal Company, Baltimore Biological Laboratory, Hartmann-Leddon Company and Air-Shields, Inc. By the end of the current year, $16,725.00 had been received toward a proposed budget of $31,000.00. Budgetary uncertainties have delayed the initiation of this program.

The College Library in 1963–64

Fiscal year. The usual hazards of budget planning were compounded this year by the change from a November to October year to a July to June year. As a result we experienced a fiscal year of eight months from November 1963 to June 1964 and started another year in July. Future budgets will be planned in advance of the fiscal year for which they are intended and without benefit of a full year's experience on which to base them. It is hoped that advantages of the more orthodox fiscal year will outweigh the short range inconvenience. The library's report year will continue on the old basis.

S. Weir Mitchell Associates. The number of S. Weir Mitchell endowments reached 125 during the current report year. The second banquet of this group was held on September 30th. It is estimated that $3,373. of income will be received from these endowments during fiscal 1964–65. Dr. George I. Blumstein and the members of his committee have kept continuing pressure behind this program and are using a variety of methods of keeping the Fellows of the College aware of this opportunity to strengthen the Library's journal lists while at the same time making their interest in the College Library a matter of perpetual record.

Library Receipts. Borrowers' fees and the schedule of Medical Documentation Service

charges were both revised during the year in a continuing effort to derive an equitable portion of library income from its users. A contract for library service was concluded with the Warren State Hospital. Experience with this contractural relationship could suggest a prototype for similar agencies which do not provide direct library services to their clintele. A growing number of non-profit agencies are voluntarily sharing the costs of the Library's services to the medical community.

Survey of Medical Library Resources of Greater New York. The degree of service extended to New York area libraries by the College led to an invitation to participate in this survey. The College Library regularly sends its interlibrary loan and photoduplication request records to the survey to provide the basis of a study of intracommunity relationships and to pinpoint the kinds of material which require borrowing from outside regional boundaries.

Research Associates. Professor David Cowen was named the second Research Associate of the College Library. Professor Cowen, who is Chairman of the Department of History at Rutgers University, plans to undertake a study of the beginnings of the U.S. Pharmacopoeia with special attention to the part played by The College of Physicians of Philadelphia. The Library's first Research Associate, Harold J. Abrahams, PH.D., completed his study of the Extinct Medical Schools of Nineteenth Century Philadelphia. This study was made possible by a grant from the National Institutes of Health. He is currently engaged in a study of similar schools in the Maryland region under a grant from the American Philosophical Society. He may next turn his attention to the specialty medical schools of Philadelphia.

Stack shifting. Eight years have passed since the Library rearranged its collections to occupy the new stack space provided by the addition to the old building. Miscalculations of areas needing the greatest provision for growth resulted in overcrowded sections which could be alleviated only by a thoroughgoing shifting of the collection. The most active phase of this shift extended for about six months beginning in February 1964. The first, second, third, fourth, and fifth floors of the old stacks (housing journal files from 1940 to date) were completely shifted. Some titles were transferred from the crowded fourth floor to the less densely shelved fifth floor in both old and new stacks. The fourth floor of the new stacks was also shifted to accommodate journals which were brought up from the third floor. Seventh floor pressure was relieved by moving the pamphlet collection to unoccupied shelves at the back of first floor new stacks. Shifting of seventh floor stack made possible by this move was delayed while the Library attempted to dispose of a collection of old dealer's catalogs which occupy space in this area. At the risk of documenting our own folly, we now hope to have achieved ten years' growing space before coping again with a move of these dimensions.

Main Card Catalog. A growth crisis also hit the library in the main card catalog. The dubious expedient of removing follower blocks had provided the last vestige of give in the catalog drawers. Architectural considerations led the original builders to design a catalog with variable drawer lengths. These aesthetic considerations were compounded by the presence of air ducts behind some sections of the catalog producing half length drawers. Since this catalog is built into the wall of the reading room a major face lifting (or advancing into the room) would be required for any long-range solution of this problem. A preliminary investigation of costs of such an operation dictated the purchase of a new 60 drawer catalog to be placed in the room near the beginning of the catalog's alphabet. The entire catalog was then moved and spread drawer by drawer. A false start traceable to the varying drawer lengths led to some second guessing. Concurrent with the shift, the framework of the catalog itself was relieved of what appeared to be a fifty-five year accumulation of dust.

Serials. An aggressive claiming campaign reactivated many titles which were too dilatory last year to merit inclusion in a count of currently received journals. This together with adjustments to the increasing coverage of the

literature by *Index Medicus* has pushed the Library's currently received serials statistic above the 3,000 mark for the first time. In anticipation of the Journal Acquisition Project a new Kardex unit was purchased.

Personnel. Last year's report rejoiced in the fact that the Library was enjoying the first full year during which it had the services of an Assistant Librarian whose time was devoted exclusively to administrative activities. This moment of glory was cut short when Miss Mary Elizabeth Feeney resigned her position to assume new duties as Associate Librarian at the New York Academy of Medicine. The sense of loss was tempered by the realization that this professional advancement was a well-deserved recognition of her competence.

This same year brought the double blow of the decisions of Mrs. Marion Schmieder, the Serials Librarian, and Dr. Edith A. Wright, the Historical Cataloger, to seek less demanding employment. The Library was blessed with good fortune when Dr. Cecilia Chen Li and Mrs. Lisabeth M. Holloway were found to fill these vacancies. Dr. Li had formerly served on the staff of the Fordham University Library. Mrs. Holloway had cataloged historical materials previously at the Academy of Natural Sciences, the Free Library of Philadelphia, and the University of Pennsylvania. She has also served as the Librarian of the Valley Forge Army Hospital.

Mrs. Judith Overmier was employed as Cataloging Assistant to replace Mr. Edward Romasko, Jr. who left the field of librarianship. Mrs. Overmier was employed previously as an assistant in the Reserve Book Department of the University of Pennsylvania. After the close of the report year, Mrs. Overmier transferred to a part-time position in the Reference-Circulation Department in order to devote more time to her studies in the School of Library Science at Drexel Institute of Technology. The Cataloging Assistantship is presently held by Miss Ida Stuber who is also taking courses at Drexel.

Miss Ann Vosburgh resigned from the position as Readers' Service Assistant to join the library staff at St. Joseph's College. This vacancy was filled by the appointment of Mrs. Grace Wozniak who previously served on the staff of the Reading Public Library. She is also a degree candidate at the Drexel School of Library Science.

Mrs. Rose Ann Murphy worked as a Readers' Service Assistant during the summer months to carry the schedule of Mrs. Helen French Schwartz who was granted a leave of absence. Mrs. Schwartz later resigned from the staff. After the close of the report year, Mrs. Edis Hall was employed on a part-time basis in the Readers' Service Department. She is also a Drexel student.

Mrs. Charna Axelrod, who carries a part-time schedule, was transferred from the Historical Department to the Serials Department. Mr. Walter Carlson, Jr. served a brief time in the Serials Department on a part-time basis.

Mrs. Helen Schneeberg served a brief tour of duty to help plan and expedite the second S. Weir Mitchell banquet. Mr. Jorge E. Saler was employed as a mimeograph operator until the U.S. Army terminated his stay in the Library.

Former full-time employees who have helped the Library on a part-time basis during the year are; Mrs. Dolores McFadden, Miss Millicent Quammen, and Mr. Steven Peitzman.

The following individuals, who are no longer on the Library staff, served as Library Pages during the report year; Miss Barbara Appell, Mr. William Blair, Miss Judith Blank, Mr. Edward Farley, Mr. Donald Inyang, Miss Dorothy Johnson, Mr. Richard Paclin, Mr. Stephen Savar, Mr. Joseph Thompson, and Mr. Jerome Zatzman.

Administrative Changes. Following the resignation of Miss Mary Elizabeth Feeney from the Assistant Librarianship, the redistribution of administrative responsibilities was reflected in the following changes of titles of positions; the Cataloger became the Head of the Processing Department, the Serials Librarian was named Head of the Serials Department, and the Reference-Circulation Librarian became Head of the Reference-Circulation Depart-

ment. These three department heads together with the Curator of the Library's Historical Collections and the Director of the Medical Documentation Service constitute an advisory committee to the Librarian.

Professional Staff Activity. The College Library was represented at the 63rd Annual Meeting of the Medical Library Association which was held in San Francisco by Miss Nancy Whitten, Miss Muriel Zeldis, and Mr. Elliott H. Morse. The following committee assignments have been accepted by Library staff members for the 64th Annual Meeting of the Medical Library Association which will convene in Philadelphia in 1965: Mr. Elliott H. Morse, Convention Chairman; Mrs. Kathryn Miragliotta, member of the Registration Committee; Miss Nancy Whitten, member of the Publicity Committee; and Miss Muriel Zeldis, member of the Program Committee. Miss Nancy E. Whitten has also accepted appointment to the Membership Committee of the Medical Library Association. She is the Secretary-Treasurer of the Philadelphia Regional Group of the Medical Library Association. Mrs. Kathryn Bernice Odom is Chairman of this same group.

Benefactors. A list of donors of books and other library materials appears in the statistical section of this report.

The Library acknowledges its gratitude to the following institutions which have shared the operational costs of the College Library.

NON-PROFIT INSTITUTIONS

Bryn Mawr Hospital Medical Staff
Chestnut Hill Hospital
Elwyn School
Fels Research Institute
Fitzgerald-Mercy Hospital
Germantown Dispensary and Hospital
Graduate School of Medicine of the University of Pennsylvania
Hahnemann Medical College
Harrisburg Hospital
Institute for Cancer Research
Jefferson Medical College
Lankenau Hospital
Medical Literature, Inc.
Arthur P. Noyes Foundation
Philadelphia General Hospital
Sacred Heart Hospital, Allentown
Saint Agnes Hospital
Seton Hall College of Medicine and Dentistry
Temple University School of Medicine
U.S. Naval Hospital Staff, Philadelphia
University of Pennsylvania School of Medicine
University of Pittsburgh School of Medicine
Walson Army Hospital Staff
Woman's Medical College of Pennsylvania

COMMERCIAL INSTITUTIONS

Air-Shield, Inc.
Atlas Chemical Industries, Inc.
Auerbach Electronics Corp.
Baltimore Biological Laboratories
James E. Beasley, Esq., Attorney
Bell Telephone Company
Bernstein, Bernstein, Levy, and Harrison
Borden Chemical Company, Research Laboratory
Campbell Soup Company
David Cohen, Esq., Attorney
Council for Tobacco Research
Dechert, Price, and Rhoads
Duane, Morris, and Hecksher
E. I. du Pont de Nemours, Haskell Laoratory
E. I. du Pont de Nemours, Lavoisier Laboratory
E. I. du Pont de Nemours, Stine Laboratory
FMC Corp.—American Viscose Division
Farnham Company
Freedman, Landy, and Lorry
General Electric Co., Missiles & Ordinance Systems Department
Hercules Powder Company
Institute for Scientific Information
Kisselman, Devine, Deighan & Montano
LaBrum and Doak
LaWall & Harrison Research Laboratories, Inc.
Lederle Laboratories (American Cyanamid Co.)
Lee Ramsdell & Company
Lemmon Pharmacal Company
Lewis & Gilman, Inc.
MacAndrews & Forbes Company
McNeil Laboratories
Mead Johnson & Company
Merck Sharp & Dohme, Rahway
Merck Sharp & Dohme, West Point
Morgan, Lewis, and Bockius
Mulford Colloid Laboratories
National Drug Company
Norwich Pharmacal Company
Ortho Research Foundation
Pennsalt Chemical Corp.
Pennsylvania Railroad Company
Pepper, Hamilton & Scheetz
Personal Products Company
Chas. Pfizer & Company
Philco Corp.
Prudential Insurance Company

Quaker Chemical Corp.
Radio Corporation of America
Richter, Lord, Toll & Cavanaugh
Rittenhouse Book Store
Rohm & Haas Company
William H. Rorer, Inc.
Samson Laboratories
Schering Corporation
Schnader, Harrison, Seagal & Lewis
Smith, Kline & French Laboratories
Squibb Institute for Medical Research
Sun Oil Company
Arthur H. Thomas & Company
Ted Thomas Associates, Inc.
Wallace Laboratories
Wyeth Laboratories

E. H. M.

Historical

The library's first Cataloguer of Historical Materials, Miss Edith A. Wright, relinquished her post at the end of April, 1964, after two years and one month of valiant efforts directed at making accessible a vast accumulation of uncatalogued historical materials, which, of course, in one sector or another was being added to daily. She was succeeded, on 16 Sept., by Mrs. Lisabeth M. Holloway, whose training, intelligence, industry, and amiability became immediately manifest to those of the staff and readers who had reason to communicate with her; in view of her late appearance on the report-year scene, documentation of her subsequent wide-scale activities will more appropriately be reserved for our next annual report.

Acquisitions of Special Interest:

Incunabulum

Honestis, Christophorus Georgius de. Super antidotariis Mesue expositio. Tractatus de aqua ordei. De modo faciendi ptisanam. Bologna, Henricus de Harlem & Johannes Walbeck, 1488. (Klebs 709.2.)

All three of the works contained in this volume are said to be important in the history of pharmacy. *Incunabula in American Libraries, Third Census* (1964), locates a copy of the edition printed in Ferrara, a few weeks earlier, in the Boston Medical Library, but was evidently unable to locate a copy of the Bologna edition.

Miscellanea

Capoa, Leonardo di (1617–95). The uncertainty of the art of physick, together with an account of the innumerable abuses practised by the professors of that art . . . London, 1684.

The library has the first (Naples, 1681) of several editions of Capoa's *Parere* in the original Italian, of which this offers a partial translation, the only one in English. Wing does not locate any copy in this country, though, according to the *Index-catalogue*, there is one in the National Library of Medicine.

Reisseisen, Franz Daniel (1773–1828). Über den Bau der Lungen; De fabrica pulmonum commentatio. Berlin, 1822.

The definitive edition (text in German and Latin, with 6 colored plates) of Reisseisen's prize essay on the structure of the lungs. The library does not have the unillustrated first edition, 1808 (Garrison-Morton 927), nor the later edition in Swedish, 1831.

Redman, John (1722–1808). Holograph letter, signed, dated Phila., July 25, 1772.

The recipient is identified only as the recently-married husband of Redman's ward "Sally". A financial transaction appears to function as the nucleus of the letter, which, however, is replete with the beneficent sentiments associated with the College's first President. The letter has been added to the monumental 2 volumes of Redman material compiled by our late friend and benefactor William N. Bradley, M.D.

Arnoldus de Villanova (1235–1312). The conservation of youth and defense of age . . . Transl. by Dr. Jonas Drummond, A.D., 1544; ed. by Charles L. Dana. Woodstock, Vermont, The Elm Tree Press, 1912.

The library has a copy of what appears to be the first edition of this famous work in Latin (Leipzig, 1511), but the British Museum has the only known copy of the original publication of Drummond's translation. The present edition was limited to 500 copies; the availability of the English translation may well prove a

boon to any of our local gerontologists whose knowledge of Latin has fallen into limbo.

[Dermatological Research Laboratories—Research Institute of Cutaneous Medicine]

We owe to Dr. Arthur D. Nelson, a Fellow of the College, the acquisition of a large collection of documentary materials, of a primary nature, bearing on the development of this important research institute, and, consequently, on the careers of its three outstanding early figures, the late Drs. John A. Kolmer, George W. Raiziss, and Jay F. Schamberg.

Exhibits. Exhibits were held in commemoration of the 400th anniversary of the birth of William Shakespeare, and the 150th anniversary of the death of Benjamin Rush. Viewers who would not have thought to look for the name of the incomparable poet-playwright in the library's catalogue seemed surprised to find in the former twenty-two separately published studies of Shakespeare's medical knowledge, to which, of course, there would have been added an even larger number of journal articles, had space permitted. Dr. Edward Rose's Kate Hurd Mead Lecture, entitled "John Lettsom and English Medicine of the Georgian Period", was provided with a special exhibit, as were the regular meetings of the Section on Medical History. The born philatelists, and many others with a tangential interest in the field, derived a great deal of satisfaction from study of a philatelic exhibit entitled 'Non-medical Medicos', contributed by Dr. Henry A. Arkless. The library's various pictorial resources were indicated by an illustrative exhibit; and another exhibit, this one contributed by Miss Nancy E. Whitten, Head of the library's Circulation and Reference Dept., illustrated for viewers the labyrinth that must be traversed by accessions from the moment of selection for adoption to the moment when they are fully registered and available for use by our readers.

Fugitive Leaves. As last year, there were eight issues of the *Leaves*, Nos. 65–72; three carried to completion publication of the Audubon letters in the Gilbert Collection, begun at the close of the last report-year; four were devoted to a manuscript account, by A. P. C. Ashhurst, of his visit to Europe in 1905; one commenced publication of excerpts from Nathan Lewis Hatfield's manuscript notes on lectures delivered by members of the original faculty of the Jefferson Medical College. The attention accorded both the Audubon correspondence and Ashhurst's descriptions of eminent European surgeons has extended, very gratifyingly, well beyond the family circle.

Curatorial wanderings. The curator attended the 1964 Annual Meeting of the American Association for the History of Medicine, held in Bethesda and Washington, serving as a member of the Council. Subsequently, he was appointed chairman of the Program Committee for the 1965 meeting, to be held in Philadelphia, and, concomitantly, a member of the Committee on Local Arrangements.

W. B. McD., 2d

Medical Documentation Service

The major events in the year herein reviewed were the termination of our participation in the publication of *An Annotated Bibliography of Influenza* and the beginning of our preparation of *Birth Defects: Abstracts of Selected Articles.* Early in 1964 we were asked by the National Foundation to select articles on birth defects from the current literature, abstract them, and prepare the material for publication. The resulting monthly abstract journal now has a considerable paid circulation. The results of a recent postcard survey of subscribers have been gratifying.

Our scanning service reported 4206 references (6329 in 1963). (For comparison 1963 data will be given in parentheses hereafter.) This represents a continued substantial decrease in the number of references reported although we scanned for an average number of 25 (23) subjects. Our increased rates for this activity were apparent in the income received: $10,917. ($9,028.).

The number of abstracts prepared was only 667 (1307). The income $4,945. ($7,406.) from abstracting reflected this decrease.

We prepared 192 (221) bibliographies and the income was $3,277. ($4,542.)

The number of translations increased slightly from 140 in 1963 to 153 in 1964. This was reflected in the income of $7,171. ($6,441.).

Patricia E. Roddy, a student at Temple University, joined the staff in December 1963 as our part-time typist. She has been a dependable and conscientious addition to our staff. Our translator and abstractor, Paul Walter, and our executive secretary, Mrs. Jean C. Stevens, continue their faithful service.

The excess of income over expenditure for the year was only about $3,000. While this sum would not cover overhead expenses calculated at 15–20% of our gross income of about $29,300, it is gratifying that there was no deficit.

W. L. B.

STATISTICAL SUMMARY*

Inventory

	1964		*1963*	
Accessioned items:[1]				
Incunabula[2]	421		420	
Manuscripts and typescripts	1,291		1,285	
General	221,914		216,470	
Accessioned pamphlets	6,036		5,481	
		229,662[3]		223,656
Unaccessioned items:[1]				
Reports	28,806		28,805	
Theses	61,436		61,121	
Pamphlets and reprints	231,568		231,540	
		321,810		321,466

Accessioned Acquisitions:

1964: 6,005 volumes (2,974 by purchase; 2,463 by gift; 568 by exchange). (Books: 1,475; Periodicals: 3,975; Pamphlets: 555).

1963: 5,027 volumes (2,263 by purchase; 2,358 by gift; 406 by exchange). (Books: 1,782; Periodicals, 2,768; Pamphlets, 477).

Non-accessioned acquisitions:[4]

1964: 385 items (Reports, 1; Theses, 315; Miscellaneous, 69).

1963: 467 items (Reports, 3: Theses, 431; Miscellaneous, 33).

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* November 1, 1963–October 31, 1964.

[1] Accessioned items in this library comprise the total number of bound volumes and such unbound pamphlets as have been cataloged as separate bibliographical units regardless of their size.

There remain many thousands of unaccessioned pamphlets awaiting accessioning and cataloging. A true quantitative and qualitative picture of the library's holdings cannot be presented until this wealth of neglected material has been processed and duly registered in our 'accessioned' or 'volume' count.

[2] The Library owns 423 incunabula, but there are two cases of two bound together, reducing the number of accessioned items.

[3] Included in this figure are the following collections which are on permanent deposit in the Library: Gross Library, 3,976 accessioned items; Parry Library of the Obstetrical Society of Philadelphia, 217; Mütter Museum, 200 (Mütter Museum books may not be removed from the College Building).

[4] As usual, not all the pamphlets, theses, and numbers of various journals listed as received have been checked for keeping or discard at the close of the library year.

Currently Received Serials

	Subscription	*Gift*	*Exchange*	*Total*
U.S.A.	424	498	66	988
Western European Continent	756	119	147	1,022
Eastern European Continent	112	56	44	212
United Kingdom and Eire	168	33	40	241
Asia (including Japan)	55	82	74	211
Latin America and West Indies	45	95	87	227
International	75	15	—	90
Canada	13	24	7	44
Pacific (including Australasia)	5	19	15	39
Africa	3	16	15	34
United Nations	11	2	—	13
Grand Total 1964	1,667	959	495	3,121
Grand Total 1963	1,476	733	433	2,642

New Titles: A total of 182 new serial titles was added in 1963/64.
Separate issues received, checked in the Kardex record and shelved totaled 21,602.

Readers' Use of the Library

Library hours. The Library was open, during the academic year, from 9:00 to 9:30 on Mondays and Wednesdays, from 9:00 to 5:00 on other weekdays. During June, July, August, and until the first Monday after Labor Day, the Library was open from 1:00 to 9:00 on Tuesdays and from 9:00 to 5:00 on other weekdays, except Saturdays, when it was closed. The following legal holidays were observed: Thanksgiving, Christmas, New Year's, Memorial, Independence, and Labor Days.

Visitors:

	Reading Room	*Periodicals Room*	*Total*
1964	10,934	3,729	14,663
1962/63	19,468	3,999	23,467

Circulation:

	Intra-mural[5]	*Extra-mural*	*Books*	*Journals*	*Totals*
1963/64	32,132	33,253[6]	11,715	53,670[6]	65,385
1962/63	33,458	28,104	10,900	50,662[7]	61,562[7]

Interlibrary loans: The Library sent 19,454 (1963: 18,966) volumes on interlibrary loan to 283 (1963: 288) libraries in 30 (1963: 33) states, Washington, D. C., and Canada, and borrowed 17 (1963: 25) volumes from 3 (1963: 4) libraries.

Photoduplications: 121,935 pages were photocopied on request (1963: 95,229).

Donations

The donors for the past year number 77 (1963: 101). The library is indebted for large gifts of books, pamphlets and unbound periodicals to the following donors: American College of Physicians; Dr. S. Bellet; Biological Abstracts; Children's Hospital; Dr. F. H. Furth; Hospital of the University of Pennsylvania; Institute of Pennsylvania Hospital; Jefferson Medical College; Mr. J. C. Johnson; Dr. R. A. Kern; Dr. E. B. Krumbhaar; Lea & Febiger; Lee Ramsdell; Merck Sharp & Dohme; National Foundation; Dr. A. N. Richards; Smith Kline & French Laboratories; Wallace Laboratories; Dr. I. J. Wolman; Wistar Institute.

Various publishing houses, among the large group of corporate donors, have presented volumes as follows: F. A. Davis Company, 62; Lea & Febiger, 9; J. B. Lippincott Co., 40; W. B. Saunders Co., 82.

Other individual donors were as follows: Drs J. H. Arnett, O. V. Batson, K. R. Boucot, C. P. Brown; Mrs. E. R. Cunningham; Drs A. M. Dannenberg, D. M. Davis, G. G. Duncan, I. I. Edgar, O. S. English, S. I. Haimowitz, B. M. Hand; Estate of Dr. R. C. Hughes; Drs. M. D. Kasser, C. P. Lawrence, F. D. W. Lukens, R. P.

[5] The number of volumes "consulted in the library" includes only those supplied on demand. Readers have access to the bound volumes of periodicals and reference works kept on the shelves in the Reading Room: the Fellows, and occasionally others, by special permission, have access to the book-stacks. There are, therefore, many volumes consulted of which no accurate record can be kept.

[6] This figure includes 6,264 unbound current issues circulated from the Periodicals Room.

[7] These are corrected figures which are different from those given in last year's report.

MacFate, A. Montague; Mrs. E. Morris, Jr.; Drs C. M. Norris, A. Ottolenghi, R. M. Platt, S. X Radbill, J. E. Rhoads, S. R. Riedman, F. B. Rogers, T. G. Schnabel, R. H. Shryock, J. H. Talbott, R. Tauber, F. Vilardell, J. A. Wagner, H. Weiss, F. Wood.

The Transactions & Studies was sent, either in exchange or as a gift, to 511 organizations.

Theses and dissertations to the number of 315 have been received on exchange from the following European schools of medicine: Universities of Basel, Bern, Copenhagen, Ghent, Jena, Leiden, Louvain, Lund, and Uppsala.

THE STAFF[8]

Librarian
Elliott H. Morse

Library Secretary
Mildred C. Gray

PROCESSING DEPT.

Muriel Zeldis, *Head*

Assistant Cataloger

Mrs. Kathryn E. Miragliotta

Cataloging Assistants

Ida Stuber
Mrs. Dolores McFadden*

REFERENCE-CIRCULATION DEPT.

Nancy E. Whitten, *Head*

Readers' Service Assistants

Mrs. Grace I. Wozniak
Mrs. Kathryn Bernice Odom*
Mrs. Edis Hall*
Mrs. Judith Overmier*

SERIALS DEPT.

Cecilia Chen Li, Ph.D., *Head*

Assistant Serials Librarian

Dorothy Minton

Serials Assistants

Mrs. Catherine Ledwell
Mrs. Charna Axelrod*

HISTORICAL COLLECTIONS

W. B. McDaniel, 2d, PH.D., *Curator*
Mrs. Lisabeth M. Holloway, *Historical Cataloger*
Mrs. Betty Voigt,* *Typist*

MEDICAL DOCUMENTATION SERVICE

Walter L. Bethel, PH.D., *Director*
Mrs. Jean C. Stevens, *Executive Secretary*
Paul Walter, *Bibliographer*
Patricia Roddy,* *Typist*

Paging Staff

Shirley Allen
Mrs. Margaret Henry
Andrea Jancsura
Sandra Martin
Steven Peitzman*
Millicent Quammen*
Thomas Summers
Geza Szarka
Halina Wierzbicki

Approved:
JOHN FRANKLIN HUBER, M.D.
Chairman, Library Committee

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1. Annual report on the library. *Transactions & Studies of the College of Physicians of Philadelphia*. 4th Ser. **28:** 180, April 1961.
2. President's Commission on Heart Disease, Cancer and Stroke. A National Program to Conquer Heart Disease, Cancer and Stroke, v. I, Washington, D. C., Government Printing Office, 1964. p. 25.
3. ADAMS, SCOTT: Medical Library Resources and their Development. *J. Med. Educ.* **38:** 20–27, January 1963.
4. BLOOMQUIST, HAROLD: The Status and Needs of Medical School Libraries in the United States: a report prepared for the National Library of Medicine. Boston, 1962.
5. Regional Plans for Medical Library Service. *Bull. Med. Lib. Assoc.* **52:** 509–513, July 1964.
6. Unpublished memorandum.

[8] Library staff list as of February 1, 1965.
* Part-time.

Annual Report of the Committee on the Mütter Museum and College Collections

THE Mütter Museum of The College of Physicians is closed Saturdays and Sundays, but is open other days from 9 A.M. to 1 P.M. and from 2 P.M. to 4 P.M.

There were 2201 visitors during the year, twenty-six states and fifteen foreign countries being represented. Besides the many individuals, large groups toured the museum from the Philadelphia College of Pharmacy, Woman's Medical College, Temple University, Hahnemann Medical College, University of Pennsylvania, Beaver College, Montgomery Hospital School of Nursing, Norristown, Clifton Heights High School, and the Franklin School of Science and Arts.

The 76th Thomas Dent Mütter Lecture on March 4, 1964, was delivered by Lauren V. Ackerman, M.D., Professor of Surgical Pathology and Pathology at the Washington University School of Medicine, St. Louis, Missouri. His subject was *The Malignant Potential of Polypoid Lesions of the Large Bowel.*

Permission was given for photographs to be taken of the Helmholtz ophthalmoscope for the Hoffman La Roche Company of New York, to illustrate an article entitled *Classics in Ophthalmology.*

An article that will appear in *Pulse of Pharmacy* by Philip H. Van Itallie will be illustrated by pictures of some of our old hypodermic syringes. A book on the *History of Ophthalmology* written by Dr. Harold G. Scheie will show some of the ophthalmological instruments in the museum. Photographs were also taken of some of the ancient Peruvian trephined skulls for the Wyeth Company. Dr. Fred B. Rogers had photographs taken of certain instruments, also for illustration.

A metal reproduction of an Ambroise Paré speculum in the collection was made by Mr. L. C. Eichner for the Smithsonian Institution.

Dr. Samuel X Radbill brought his class in pediatrics to the museum, as he has done for several years, to acquaint them with some of the instruments and other material.

Mrs. Ella N. Wade was reappointed curator for the year 1964–65.

Committee on College Collections

During the year oil portraits of Plunket Fleeson Glentworth by Gilbert Stuart, and Joseph Louis Gay-Lussac by Rembrandt Peale were restored by the Newman Galleries.

The oil portrait of Dr. J. Solis-Cohen by Mr. W. T. Thomson was loaned for the luncheon at the Bellevue-Stratford Hotel on May 28th, 1964.

Historical items were loaned for exhibit at the University of Pennsylvania during the Bicentennial Celebration of the Founding of the School of Medicine. Dr. Doris A. Howell from the Woman's Medical College borrowed several nostrums for illustrations on a television program.

All gifts were again catalogued in College Collections so that they might be loaned upon request.

The following gifts were presented by *Dr. Fred B. Rogers:* framed print of "Doctor of Physic: Full Dress"—Oxford, 1813; framed print of "The College of Physicians"—London, 1808; modern wooden monaural stethoscope from Russia (1960); antique 'accordion book' on medicine written in Sanskrit, on palm leaves, from India.

A Bogg's coagulometer, a stage micrometer (1910) and a bronze medal of Theobald Smith (1939) were the gifts of *Dr. Claude P. Brown.*

Dr. Max Kasser presented a collection of instruments for the ear, and an interesting bezoar or hair ball from some animal.

A death mask of Dr. William W. Keen by R. Tait McKenzie was found and given to the College. A card on the box containing the mask, signed *Florence Keen*, advised that it was not to be given to the College before 1960.

Dr. J. Monroe Thorington presented silver cuff links worn by his father while a student at the Jefferson Medical College, and a medical fraternity pin also belonging to Dr. James Thorington. Votive offerings from Mexico were also presented by him.

Dr. Thomas S. Githens presented instruments formerly belonging to his father, Dr. W. H. Githens, who was active in the Obstetrical Society of Philadelphia from 1877 to 1895. They consist of three vaginal specula, namely, Howard's, De Vilbiss' and Kolbe's, a trocar and uterine applicator and electrode.

Two small cases of ophthalmic instruments and a case of trial lenses once belonging to Dr. George de Schweinitz are the gift of *Dr. Harold G. Scheie.*

Prof. Robert E. Spiller contributed a framed picture of the Philadelphia Orthopedic Hospital showing Dr. S. Weir Mitchell examining a Civil War veteran.

An old bottle of medicinal compound patented in 1905 was presented by *Dr. Edwin L. Lame.*

Mrs. Ella N. Wade was reappointed custodian of College Collections for the year 1964–65.

A. Reynolds Crane, M.D.
Chairman

List of College Lectures, 1964

8 January 1964

SHELLEY, WALTER B. The Basophil Leucocyte as an Index of Immediate Hypersensitivity. (Hira S. Chouké Lecture V; *Transactions & Studies*, July 1964.)

5 February 1964

HUME, DAVID M. Renal Homotransplantation in Man. (Mary Scott Newbold Lecture LXXXVI.)

4 March 1964

ACKERMAN, LAUREN V. Malignant Potential of Polypoid Lesions of the Large Intestine. (Thomas Dent Mütter Lecture LXXVI; *Transactions & Studies*, July 1964.)

1 April 1964

GOOD, ROBERT A. The Role of the Thymus and Other Central Lymphoid Tissue in Immunobiology. (Mary Scott Newbold Lecture LXXXVII.)

21 April 1964

ROSE, EDWARD. John Coakley Lettsom and English Medicine in the Georgian Period. (Kate Hurd Mead Lecture XVI; *Transactions & Studies*, October, 1964.)

20 May 1964

Joint Meeting of the Philadelphia County Medical Society and The College of Physicians of Philadelphia.

I. Presentation of the 41st Annual Strittmatter Award to Dr. Bernard P. Widmann, by Dr. George Willauer, Chairman Strittmatter Award Committee.

II. Presentation of citations to physicians who have completed fifty years in the practice of medicine. Certificates awarded by Dr. Wilbur E. Flannery, President, Pennsylvania State Medical Society.

30 September 1964

BLUMSTEIN, GEORGE I. Second S. Weir Mitchell Associates Banquet. (*Transactions & Studies*, January 1965.)

7 October 1964

MACKAY, ROLAND P. The Temporal Lobe and Human Behavior. (S. Weir Mitchell Oration XVII; *Transactions & Studies*, January 1965.)

4 November 1964

DEITRICK, JOHN E. Universities of Health and the Future of Medical Practice. (Mary Scott Newbold Lecture LXXXIV; *Transactions & Studies*, April 1965.)

19 November 1964

KIMBEL, PHILIP. Meeting the Challenge of Chronic Pulmonary Disease. (Arthur Parker Hitchens Lecture IX.)

2 December 1964

LAMBERTSEN, CHRISTIAN J. Implications of High Pressures of Oxygen in Medicine. (Alvarenga Lecture XXIV.)

Transactions of the Sections

SECTION ON GENERAL MEDICINE

26 October 1964

Clinical Aspects of Infection with Atypical Tubercle Bacilli. Peter A. Theodos, M.D. (Discusser: Arthur R. Gaines, M.D.*) (*Abstract 1, below*)

Relation of Atypical Mycobacteria to *M. tuberculosis*. Hobart A. Reimann, M.D., and Pearl P. C. Ma, PH.D.* (Discusser: Amedeo Bondi, PH.D.*) (*Abstract 2, below*)

Echinococcus Disease. Akbar Bonakdarpour, M.D.* (Discusser: Fred B. Rogers, M.D.) (*Abstract 3, below*)

The Newer Penicillins. Amedeo Bondi, PH.D.* (Discusser: Hobert A. Reimann, M.D.) (*Abstract 4, below*)

23 November 1964

"Silent" Rheumatic Aortic Regurgitation. Bernard L. Segal, M.D.*, William L. Likoff, M.D.*, Albert J. Kaspar, M.D.*, Paul Novack, M.D.*, and Hratch Kasparian, M.D.* (Discusser: A. N. Moghadam, M.D.*) (*Abstract 5, below*)

Pulmonary Branch Stenosis Studied by Intracardiac Phonocardiography. Leone F. Mattioli, M.D.*, and A. N. Moghadam, M.D.* (Discusser: Gerardo Voci, M.D.*) (*Abstract 6, below*)

Phonocardiographic Differentiation between Aortic and Pulmonic Insufficiency. John H. Killough, M.D., PH.D.*, and Robert H. Schwab, M.D.* (Discusser: Bernard L. Segal, M.D.*) (*Abstract 7, below*)

The Effects of Smoking on the Cardiac Output at Rest and during Exercise in Patients with Healed Myocardial Infarction. William S. Frankl, M.D.*, William L. Winters, Jr., M.D.*, and Louis A. Soloff, M.D. (Discusser: Paul Novack, M.D.*) (*Abstract 8, below*)

25 January 1965

Combined Radiation Therapy and Surgery for Carcinoma of the Lung. Luther W. Brady, M.D., Leon Cander, M.D.*, Patricia A. Germon, M.D.*, and Charles C. Wolferth, Jr., M.D. (Discusser: Charles C. Wolferth, Jr., M.D.) (*Abstract 9, below*)

Changes in Pulmonary Physiology after Radiation Therapy for Carcinoma of the Lung. Patricia A. Germon, M.D.*, Luther W. Brady, M.D., and Leon Cander, M.D.* (Discusser: Leon Cander, M.D.*) (*Abstract 10, below*)

Respiratory Disorder in Cystic Fibrosis. George Polgar, M.D.* (Discusser: Giulio J. Barbero, M.D.*) (*Abstract 11, below*)

Present State of Knowledge of Lung Clearance. Heinrich Brieger, M.D.* (Discusser: William S. Blumenthal, M.D.*) (*Abstract 12, below*)

SECTION ON MEDICAL HISTORY

13 October 1964

(During the academic year 1964–65, as part of the Bicentennial of Medical Education, the Section will devote one program to each of Philadelphia's five medical schools.)

The Development of Specialty Medical Clinics at the Hospital of the University of Pennsylvania. T. Grier Miller, M.D.

Contributions of the University of Pennsylvania School of Medicine to Medical Education. George W. Corner, M.D.

8 December 1964

(Dr. Edward Louis Bauer, Emeritus Professor of Pediatrics, Jefferson Medical College, presiding.)

Thomas Eakins (1844–1916): Painter, Sculptor, Teacher. Gonzalo E. Aponte, M.D.

Robley Dunglison: An Eminent Figure in Philadelphia Medicine. Samuel X Radbill, M.D.

The Development of Bronchoscopy at Jefferson. John J. O'Keefe, M.D.

* By invitation.

9 February 1965

The Woman's Medical College of Pennsylvania. Catharine Macfarlane, M.D.

Ann Preston, First Woman Dean, 1866–1870. Marion S. Fay, PH.D.

Chevalier Jackson: President, 1935–41. Emily Lois Van Loon, M.D.

SECTION ON OPHTHALMOLOGY[1]

15 October 1964

Differential Diagnosis of Retinochisis. William S. Tassman, M.D. (Discusser: P. Robb McDonald, M.D.)

Ultrasonics in Ophthalmology. Lov K. Sarin, M.D.* (Discusser: P. Robb McDonald, M.D.)

Sympathetic Ophthalmia: Case Reports. Donelson R. Manley, M.D.* (Discusser: Charles G. Steinmetz, III, M.D.*)

19 November 1964

Surgical Anatomy of Angle Closure Glaucoma. Kenneth C. Swann, M.D.*, Professor of Ophthalmology, University of Oregon School of Medicine. (Twenty-seventh Annual de Schweinitz Lecture.)

17 December 1964

The Clinical Application of Spectral Reflectance. Thomas Behrendt, M.D.* (Discusser: Thomas D. Duane, M.D.)

Cystic Fibrosis with Long Term Chloramphenicol Therapy. Robison D. Harley, M.D. (Discusser: Nancy N. Huang, M.D.*)

21 January 1965

Memorial to Alexander G. Fewell, M.D. Warren S. Reese, M.D.

Ocular Changes Associated with Long Term Chlorpromazine Therapy. Samuel L. DeLong, M.D.

Case Reports: Traumatic Enucleation.

1. Donelson R. Manley, M.D.* (Discusser: Charles G. Steinmetz, III, M.D.*)
2. Maurice M. Meyer, Jr., M.D* (Discusser: Philip G. Spaeth, M.D.)

[1] Abstracts of the presentations at this Section customarily appear in the *American Journal of Ophthalmology* and *A. M. A. Archives of Ophthalmology.*

SECTION ON OTOLARYNGOLOGY[2]

2 February 1965

The History of Management of Chemical Burns of the Esophagus. Paul H. Holinger, M.D.* (The Jackson Memorial Lecture.)

SECTION ON PUBLIC HEALTH, PREVENTIVE AND INDUSTRIAL MEDICINE

19 November 1964

Meeting the Challenge of Chronic Pulmonary Disease. Philip Kimbel, M.D. (Arthur Parker Hitchens Lecture IX. Joint meeting with Pennsylvania Public Health Association, Region One.)

Abstract 1

Clinical Aspects of Infection with Atypical Tubercle Bacilli. Peter A. Theodos, M.D., Department of Medicine, Jefferson Medical College of Philadelphia.

The clinical significance of atypical acid-fast organisms isolated from the sputum of patients with chronic lung disease resembling tuberculosis is an increasingly important problem. The long established concept that these organisms are saprophytes and incapable of producing human disease is in need of change. It is now known that some of the unclassified mycobacteria are capable of acting as primary pathogens in man, establishing themselves in the lower respiratory tract and producing a relatively benign but often protracted illness.

Experience with this problem has been in three types of clinical situations: (1) where the atypical organisms seem to be the only cause of the pulmonary disease. (2) Where the atypical organisms are found in patients with previously known mycobacterium tuberculosis disease, either healed or active, and (3) where the organisms are reported in patients with negative x-rays.

In the past 1½ years, 60 cases of such organisms have been reported by the Department of Health laboratories, 10 of these from Health

[2] Abstracts of the presentations at this Section customarily appear in the *A. M. A. Archives of Otolaryngology.*

District 5, which encompasses a population of some 250,000 people. Two of the 10 were scotochromogens and two *M. fortuitum* or rapid growers. The other six were not classified. In one case, the disease was considered to be due to the atypical organisms alone; in six cases they were found following previous infection with mycobacterium tuberculosis, and in three instances the organisms were present with negative chest x-rays.

At Jefferson Hospital, 35 cases of chromogenic infection have been reported in the past ten months—out of a total of 2917 cultures for a rate of 1.2%. The organisms have been recovered from sputum in 22 cases, gastric washings in four, urine in six and from biopsy specimens in three. Eight of the 35 cases have occurred in patients with pulmonary anthracosilicosis.

The following facts are known: (1) Some of the atypical bacilli are capable of producing pulmonary disease which on a clinical basis cannot easily be differentiated from those with ordinary tuberculosis. (2) The organisms apparently are not strains or variants of mycobacterium tuberculosis and probably are not drug induced mutants. (3) The mode of transmission to man is uncertain. They are probably noncontagious and prolonged isolation and public health measures are therefore unnecessary. (4) Sensitivity to tuberculin is low. (5) Pulmonary lesions tend to remain localized and the upper lobes are most frequently involved. The lesions are usually fibrotic and single or multiple cavities are frequent, usually located in the anterior segments. (6) Extrapulmonary lesions are rare. (7) Resistance to the ordinary chemotherapeutic agents is common and response to chemotherapy is generally poor. (8) Results are better with surgery and early extirpation of the localized disease is often curative.

A rational approach to this problem at this time would involve the following considerations: (1) These patients should be considered as non-contagious and be permitted to remain in their natural environment and to work. (2) A trial at chemotherapy is indicated if symptoms are present or progressive pulmonary involvement occurs, and (3) surgical extirpation of the localized disease should not be delayed.

Abstract 2

Relation of Atypical Mycobacteria to *M. tuberculosis*. Hobart A. Reimann, M.D., and Pearl P. C. Ma, PH.D. Hahnemann Medical College and Hospital, Philadelphia, Pa.

According to different opinions, the so-called anonymous, unclassified, or atypical mycobacteria that occasionally cause tuberculosis-like disease are (a) separate forms unrelated to *M. tuberculosis*, or (b) are dissociant forms thereof. During experiments over three years, descendants of a single bacillus of H37Rv tubercle bacilli were grown under various conditions on different media, and tested by the procedures in current use for identification. Twenty-one clones were studied in detail. Of these, 14 retained most of the original features and were regarded as *M. tuberculosis* that had changed slightly. Seven other descendants had many or most of the features of the atypical strains. Because of the inconstant or inconsistent behavior, none of the tests applied was wholly reliable for identification.

Evidently, some dissociant forms of *M. tuberculosis* have the characteristics of the atypical mycobacteria. As in the case of other microbes, it is unknown if dissociation occurs in persons infected with tubercle bacilli, if dissociation is abetted by antimicrobic therapy, or if reversion of the dissociants to classic *M. tuberculosis* is of epidemiological or clinical import.

Abstract 3

Echinococcus Disease. Akbar Bonakdarpour, M.D., Department of Radiology, Temple University Medical Center, Philadelphia, Pa.

There are two types of Echinococcus disease. The more common type is the unilocular hydatid disease which is caused by *Echinococcus granulosus*. The rare but much more grave form is the alveolar echinococcosis which is caused by *Echinococcus multilocularis* (1).

I have reviewed 112 cases of hydatid cyst

TABLE I

Comparison of 112 cases of hydatid cyst collected by the author in Teheran, Iran, with 541 recorded cases in the United States as reported by Katz and Pan.*

Organ Involved	No. in Teheran	No. in the U.S.A.†
Liver	54	402
Lung	31	54
Spinal Cord	5	1
Spleen	3	15
Brain	3	6
Peritoneum	4	49
Bone	2	9
Bladder	2	6
Body wall (muscle, etc.)	4	17
Thyroid Gland	1	0
Kidney	1	21
Breast	1	5
Pleura	1	9
Prostate	0	2
Heart	0	2
Eye	0	1
Ovary	0	1
Uterus	0	1

* In an additional 15 cases the exact location of the cyst is not known. These cases have been omitted from the total cases in the list by Katz and Pan.

† Some of the patients in the Katz and Pan series had multiple site of involvement; therefore the total number is 601 instead of 541.

(2), which were operated upon at Teheran University Hospitals during the years 1946–1953 (Table 1).

Although Echinococcus disease is a rare entity in the United States, 556 recorded cases were collected by Katz and Pan in 1958 (3). The majority of them were seen among the immigrants from the other parts of the world. Thirty-eight patients with Echinococcus disease can be considered to be native cases. Our cases have been compared to the U.S.A. series in Table 1.

According to Hutchinson (4), this infection appears to be more common in Mississippi than other parts of the continental United States exclusive of Alaska.

Hydatid cyst is produced by the larva of *Echinococcus granulosus*, which is called Echinococcus polymorphus or hydatid.

Infestation is usually indirect, but in secondary form it is direct. In the usual indirect form of infestation, the definitive host is either dog or similar carnivorous animals. The intermediate hosts are human, cows, sheep, pigs, and other carnivores.

When a cyst is formed in an organ, the surrounding tissues produce a reactive layer which is called ectocyst or pericyst. The cyst wall *per se* is called endocyst. Cysts may be single or multiple.

The most common type is echinococcus disease of the liver (54 out of 112 cases in our series). In centrally located large cysts, there is evidence of liver enlargement. In the cysts of the anterior and inferior portions of the liver, a mass can be palpated attached to the liver. If there is leakage into the biliary duct system there may be colic and jaundice. Sometimes the cyst may rupture into the pleura or peritoneal cavity with severe shock and other symptoms. Roentgen examination may reveal a soft tissue density producing extrinsic pressure upon the neighboring organs. If there is egg shell or polycyclic calcification the cyst is inactive.

The second commonest site is that of the lung (31 cases in our series).

In closed cysts the common findings are cough, hemoptysis, pain, urticaria, and, in advanced cases, cachexia. Pleurisy may be associated with large peripheral cysts. Sometimes the patients are symptom free and the cyst is an incidental finding.

The cyst may rupture into a bronchus producing severe chest pain and expectoration of a large quantity of fluid. Death may occur due to suffocation, hemoptysis, or anaphylactic shock. Rupture into the pleural cavity may also occur. An open cyst may become infected to produce a pulmonary abscess or pyopneumothorax. Roentgen examination shows a rounded or ovoid density in closed cysts. Not infrequently they are multiple. Camelote or water lily sign is pathognomonic of ruptured pulmonary hydatid cysts. Cysts also may develop in other organs; they produce symptoms according to their localization. Roentgenologically, cysts of the

kidneys, brain, and soft tissues manifest themselves as rounded space occupying lesions. In the bones, the cyst produces a non-specific destructive lesion which may be multiloculated and has sclerosing margins. Intraabdominal, intracranial, and soft tissue cysts may calcify. In no instance was calcification of pulmonary cysts observed in our series.

Two common tests have been used for the diagnosis of hydatid cyst:

1. Intradermal test or Casoni reaction (positive in 75 to 92% of cases).

2. Complement fixation test (positive in 50 to 60% of cases). Other tests such as the indirect hemagglutination test have also been used by some investigators (5). Eosinophilia is present in active cysts.

Scanning by radioactive gold Au^{198} has been performed for estimating localization, postoperative changes and recurrence of hydatid cysts (6).

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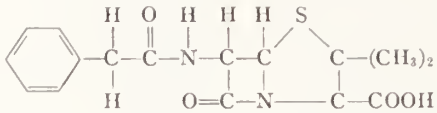
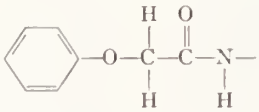
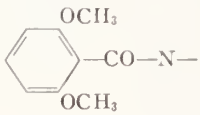
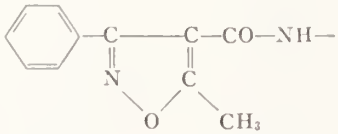
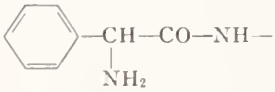
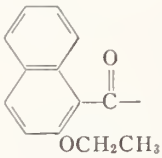
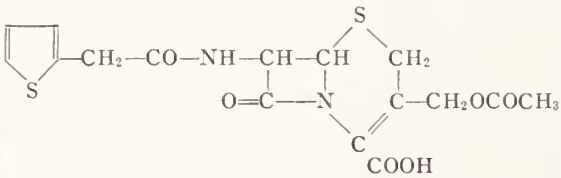
Abstract 4

THE NEWER PENICILLINS. Amedeo Bondi, Ph.D., Department of Microbiology, Hahnemann Medical College and Hospital, Philadelphia, Pa.

PENICILLIN AND CEPHALOSPORIN DERIVATIVES

Derivative	Chemical Structure	Penase Hydrolysis	Oral Absorption	Relative Antimicrobial Activity		
				Gram +	Gram −	Res. Staph.
Benzyl Penicillin (Penicillin G)		4+	1+	4+	±	−
Phenoxymethyl- (Penicillin V)		4+	3+	4+	±	−
Dimethoxyphenyl- (Methicillin)		±	−	2+	±	3+
Methyl-phenyl-Isoxazolyl- (Oxacillin)		±	3+	3+	±	4+
Aminobenzyl- (Ampicillin)		4+	2+	2+	2+	−
Ethoxy-Napthamido- (Nafcillin)		±	2+	3+	±	4+
7-(thiophene-2-acetamido) Cephalosporanic (Cephalothin)		−	−	3+	2+	3+

Abstract 5

"SILENT" RHEUMATIC AORTIC REGURGITATION. Bernard L. Segal, M.D., William L. Likoff, M.D., Albert J. Kaspar, M.D., Paul Novack, M.D., and Hratch Kasparian, M.D. Department of Medicine, Hahnemann Medical College and Hospital, Philadelphia, Pa.

The fundamental auscultatory finding in rheumatic aortic regurgitation is an early blowing diastolic murmur heard at the aortic area or along the lower left sternal border. This regurgitant murmur is best demonstrated when the diaphragm of the stethoscope is pressed firmly against the chest wall with the patient

leaning forward and the breath held in forced expiration. Although at times it may be faint and difficult to hear, this murmur should be quite apparent at the bedside if proper care is exercised in the examination.

Attention is now drawn to the fact that the characteristic murmur of aortic regurgitation may not be heard at all when serious degrees of incompetence exist in association with other important rheumatic valvular defects. Sixteen patients are presented in whom the murmur of aortic regurgitation could not be heard or demonstrated by external phonocardiography and yet cineaortography confirmed the presence of serious aortic incompetence.

Intracardiac phonocardiography in two of the patients clearly indicated that the murmur was present in the outflow tract of the left ventricle and was confined to the area of the regurgitant jet.

The reasons for failure of the murmur to be transmitted to the chest wall are probably related to its high-frequency, the anatomic dysfunction of the valve and the physical properties of the regurgitant jet. The intracardiac phonocardiographic observations suggest that the high-frequency vibrations in diastole were so limited in intensity and so restricted to a precise area in the regurgitant jet that they could not have been directed to tissues favoring their transmission to a point along the anterior surface of the chest.

The diagnosis of "silent" aortic regurgitation usually is suggested by the clinical manifestations which cannot be attributed to the associated and more obvious valvular lesion. In many instances these findings are easily recognized at the bedside. For, example, in patients with the auscultatory signs of isolated mitral stenosis, the presence of coronary insufficiency pain, a brisk carotid pulse or a wide pulse pressure alone or in combination, are most compelling reasons to contemplate "silent" aortic regurgitation, particularly when the left ventricle is palpable. The suspicion matures to a plausible conclusion if the electrocardiogram suggests left ventricular strain or hypertrophy and the x-ray film indicates left ventricular enlargement, or if aortic valve calcification is seen.

It is suggested from these observations that even when aortic regurgitation is actually a "silent" lesion, its presence can be suspected from a combination of clinical, radiologic and electrocardiographic findings which can be confirmed by cineaortography.

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Abstract 6

Pulmonary Branch Stenosis Studied by Intracardiac Phonocardiography.[3] Leone F. Mattioli, M.D., and A. N. Moghadam, M.D. Section of Pediatric Cardiology, Philadelphia General Hospital, Philadelphia, Pa.

Coarctation of the pulmonary artery branches was first described in 1938 by Oppenheimer (1). Numerous papers have since appeared in the literature dealing with classification and establishment of diagnostic criteria, which are:

1. Presence of a pressure gradient between pulmonary artery trunk and one or both branches.
2. Angiocardiographic demonstration of the stenosis.
3. Presence of characteristic pressure tracing in the pulmonary artery trunk.

At least two of these criteria are required to establish the diagnosis (2–3). It has also been emphasized that characteristics, location and diffusion of the murmur are of diagnostic value particularly in bilateral stenosis without associated anomalies (4).

The purpose of this communication is to present the auscultatory and phonocardiographic findings associated with proximal bilateral coarctation of pulmonary artery branches, which was the most common type of anomaly

[3] This work was aided by a grant-in-aid from the American Heart Association, by a contract (NR 102-470) with the Office of Naval Research, Department of the Navy, and by a research grant (HE 07415) from the National Heart Institute of the National Institutes of Health.

found in our series of pulmonary artery branch stenotic lesions. Cases with associated anomalies have not been included in this study.

In 15 infants and children studied in our laboratory the diagnosis of bilateral stenosis of pulmonary artery branches at the bifurcation was established by the presence of a pressure gradient across the coarcted areas, visualization of the lesion by angio- or cineangiocardiography and by the presence of a typical pulmonary trunk pressure tracing in cases of severe coartation. ICPG (intracardiac phonocardiography) was added to the investigation in all cases. A barium titanate phonocatheter was guided into the right atrium, right ventricle, main pulmonary artery and branches. A high frequency, high intensity ejection systolic murmur was localized inside the right and left pulmonary arteries in all cases. This murmur disappeared as the catheter was withdrawn into the main pulmonary artery. There was no murmur inside the right ventricle or right atrium but a less intense systolic murmur was heard and recorded inside the superior vena cava. This stenotic murmur, was faintly transmitted and recorded inside the superior vena cava which lays anterior and in close anatomical relationship with the right pulmonary artery. The murmur of stenosis of pulmonary artery branch changed with respiration being louder during inspiration. The second heart sound was accentuated if the pressure gradient across the obstruction was above 75 mm. Hg; otherwise it was normal. In no instance was a continuous murmur recorded. External phonocardiography showed that a systolic murmur of similar configuration was present and clearly recorded under the right and left clavicles in the first and second intercostal space. Such murmur was also distinctly recorded in the supraclavicular fossae and rather faintly posteriorly between the scapulae. According with these findings, we believe that a systolic ejection murmur heard under the right and left clavicle and above the clavicles in the supraclavicular fossae, which varies in intensity with the respirations and is followed by a normal or accentuated pulmonic sound, is highly suggestive of the diagnosis of bilateral stenosis of pulmonary artery branches.

In the differential diagnosis, difficulty may arise with mild pulmonic valvular stenosis when the systolic murmur is transmitted to the neck. The almost invariably present ejection sound in PVS, however, and the fact that the murmur is best heard in the third left intercostal space and does not diffuse through the lung fields as it occurs in bilateral coarctation of the pulmonary artery branches, help differentiate these two lesions. We were unable to find diastolic murmurs within the pulmonary vessels in our series of isolated bilateral coarctation of pulmonary artery branches. This is in contrast with some reports that describe the presence of a continuous murmur well heard and recorded on the chest (3, 5, 6). We believe that in order to have a continuous murmur in this anomaly there must be multiple coarctations of the pulmonary artery branches distal to the bifurcation or a small patent ductus arteriosus must be present.

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Abstract 7

PHONOCARDIOGRAPHIC DIFFERENTIATION BETWEEN AORTIC AND PULMONIC INSUFFICIENCY. John H. Killough, M.D., PH.D., and Robert H. Schwab, M.D. Department of Medicine, Jefferson Medical College of Philadelphia.

Patients presenting with high-pitched diastolic decrescendo murmurs along the left sternal border may have insufficiency of either the pulmonic or aortic valve. Theoretically, using phonocardiography, one should be able to ascertain which semilunar valve gives rise to the murmur by observing the relationship of the diastolic murmur to the aortic and pulmonic components of the second heart sound If the diastolic murmur begins immediately with the aortic component, the aortic valve is the insufficient valve. However, if there is a relatively silent interlude between the aortic and pulmonic components of the second sound and the murmur starts immediately with, or within a few hundredths of a second after the pulmonic component, the source of the murmur is the pulmonic valve.

Employing a Sanborn twin beam unit in which the logarithmic filter has been replaced with a Sanborn filter amplifier unit and using the high frequency response filter with a contact microphone it is possible to dampen out the low frequency components of the heart sounds. A relatively clear interval is obtained between the aortic and pulmonic components, and it is possible to record even faint, high-pitched diastolic murmurs. To investigate the diagnostic accuracy of this technique, phonocardiograms have been taken at a paper speed of 75 mm./sec. on patients in whom the valvular lesion was subsequently determined by more direct means. The correlation between the phonocardiographic analysis and the findings at surgery and necropsy have been excellent and are discussed in some detail.

Abstract 8

THE EFFECTS OF SMOKING ON THE CARDIAC OUTPUT AT REST AND DURING EXERCISE IN PATIENTS WITH HEALED MYOCARDIAL INFARCTION.[4] William S. Frankl, M.D., William L. Winters, Jr., M.D., and Louis A. Soloff, M.D. Department of Medicine, Temple University Medical Center, Philadelphia, Pa.

Previous work has shown that smoking increases the cardiac output at rest in normal, healthy young habitual smokers (1, 2). This study was undertaken to determine if patients with healed myocardial infarction respond in a like manner, and also to test their responses during exercise.

METHODS AND MATERIALS

Eight patients, five males and three females, ages 48 to 69, with documented healed myocardial infarction, were studied. Six were habitual smokers and two were nonsmokers. Each patient served as his own control. Some of the patients were studied in the fasting state and some after eating. The orders of smoking and nonsmoking studies were randomly selected. Each patient smoked two standard sized filter tip cigarettes within ten minutes. Cardiac output, cardiac index, and stroke volume were measured at rest, in the supine position, by the dye dilution technique with an indwelling Cournand brachial arterial needle, a Gilford densitometer, indocyanine green dye, and an Electronics for Medicine multichannel direct writer recorder. Exercise was performed on a bicycle-ergometer set at 25 kilograms per watt, with the patient cycling for three minutes at 60 RPM, and the above mentioned physiologic measurements were repeated. Each determination was performed in duplicate in six of the eight patients, and the average calculated and recorded.

RESULTS

The changes in cardiac output and stroke volume after smoking were not significant either at rest ($P > 0.05$) or during exercise (output $P > 0.20$, stroke volume $P > 0.50$). There was,

[4] Supported by the Tobacco Research Institute and by a General Support Research Grant from the U. S. Public Health Service.

however, a significant change in heart rate after smoking at rest ($P < 0.02$) and during exercise ($P < 0.05$). This dissociation between heart rate and stroke volume was previously noted in the healthy young habitual smokers pretreated with glucose (1).

Discussion

Smoking in our patients with healed myocardial infarction failed to produce the striking increases in cardiac output and stroke volume seen in young healthy habitual smokers (1, 2). Since our work has begun, there have been similar differences reported in abstract form by Pentecost (3), and in an older study by Regan and his co-workers (4). These findings are in contrast to variable results obtained with the ballistocardiogram (5, 6).

Why the patient with healed myocardial infarction fails to develop a significant rise in cardiac output, cardiac index, and stroke volume in contrast to the response of the young normal subject is not clear. Such failure does not appear to be related to a longer established smoking habit, because two of our patients were nonsmokers. Unpublished work in our laboratory tentatively suggests that the catecholamine concentration of hearts from persons in the older age group with heart disease may not significantly differ from the younger person with heart disease. Perhaps the diseased heart is less capable of responding to these hormones, or perhaps less catecholamines are released from extracardiac tissues.

The data herein reported is similar to the initial effect of smoking on young habitual smokers pretreated with glucose. Under such circumstances, the smoking-induced increase in cardiac output and stroke volume are blocked but the initial increase in heart rate is not.

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Abstract 9

Combined Radiation Therapy and Surgery for Carcinoma of the Lung.

Luther W. Brady, M.D., Leon Cander, M.D., Patricia A. Germon, M.D., and Charles C. Wolferth, Jr., M.D. Departments of Radiology, Medicine and Surgery, Hahnemann Medical College and Hospital, Philadelphia, Pa.

Although the etiology of lung cancer is yet to be fully delineated, there is no doubt but what there is an increase in the incidence of this disease. Despite the application of better diagnostic techniques, a discouragingly small portion of the patients with lung cancer are candidates for surgery when first seen by the physician. In spite of the great care in selection of patients for operation, the total five-year survival rates for surgery alone are frustratingly poor, being variously reported from 5% to 10%. Since a relatively small number of patients have clinically resectable tumors, a considerable number of patients are presented for radiation therapy. After extensive trials, the results of definitively administered radiation therapy for the control of bronchogenic carcinoma have been disappointing, the five year survival rates being variously reported from 5% to 10%.

Based on present knowledge of the natural behavior of lung cancer, it was thought highly probable that judicious use of pre-operative irradiation could increase the cure rate in some groups of patients. The theoretical advantages

of combined therapy would be to render operable those tumors which were considered inoperable, to diminish or avoid direct surgical seeding and/or distant metastases, to control disease in more patients with regional lymph node metastases and to make possible a less radical operation (lobectomy) for disease control in a larger number of patients.

A clinical study was undertaken at the authors' institution utilizing 2 Mev supervoltage pre-operative irradiation in a selected group of bronchogenic carcinomas. The patients selected for treatment had proven bronchogenic carcinomas with disease localized to one side of the chest, without pleural effusion, without supraclavicular scalene node metastases and were considered resectable at the time of the institution of the program.

A single basic technique for radiation therapy was utilized, namely, 4,000 rads to the whole mediastinum and primary tumor in four weeks. Between the last day of irradiation and surgical intervention, four weeks were allowed to elapse. Operation was performed on those patients who did not develop distant metastases. The changes in the normal tissue of the lung and mediastinum encountered at operation were slight.

The results of this program will be presented.

This preliminary study seems to indicate that combined therapy is possible with the technique described and that promising results can be achieved. On the basis of the present study, the following criteria for the selection of patients for treatment were developed:

1. The patient must be medically operable.
2. The lesion must be surgically resectable.
3. The disease should be unilateral and intrathoracic.
4. A diagnosis should be established without thoracotomy.
5. There should be no pleural effusion.
6. No co-existing malignancy.
7. If an adenocarcinoma is present, other sites should be eliminated as the source.
8. There should be no supraclavicular or scalene involvement.

The importance of close collaboration between the surgeon, pulmonary physiologist and radiotherapist for planning and executing the combined program is stressed.

Abstract 10

CHANGES IN PULMONARY PHYSIOLOGY AFTER RADIATION THERAPY FOR CARCINOMA OF THE LUNG. Patricia A. Germon, M.D., Luther W. Brady, M.D., and Leon Cander, M.D. Departments of Medicine and Radiology, Hahnemann Medical College and Hospital, Philadelphia, Pa.

The following pulmonary function studies were performed on 15 patients with confirmed diagnosis of lung carcinoma prior to and within 1 month following completion of x-ray therapy: vital capacity (VC), residual volume (RV), maximum breathing capacity (MBC), maximum expiratory flow rate (MEFR), single breath nitrogen test for alveolar gas distribution (SB_{N_2}), breath-holding pulmonary diffusing capacity for carbon monoxide (DL_{CO}), expired minute volume ($\dot{V}e$), specific dynamic lung pulmonary compliance (C_{dyn}), arterial O_2 tension (Pa_{O_2}), arterial CO_2 tension (Pa_{CO_2}), and arterial pH. There were 14 men and 1 woman, median age 58 years, included in the study. Eleven patients treated with the Van de Graaf generator received a median dose of 5,200 rads through parallel opposed portals during a median elapsed time of 34 days. Four patients, treated with a 250 KV constant potential device, received a median dose of 3,200 rads through multiple portals over a median elapsed time of 18 days.

Comparison of results before and after therapy revealed no change in VC, RV, MBC, MEFR, SB_{N_2}, $\dot{V}e$, C_{dyn}, Pa_{O_2}, and pH. Of note was the significant fall in DL_{CO} following treatment which appeared to be a function of the total amount of radiation given when expressed as volume dosage. Prior to therapy, alveolar hyperventilation was present as shown by the decreased Pa_{CO_2}. Following radiation, the hyperventilation lessened as shown by the significant rise in Pa_{CO_2} toward a normal value.

Other investigators (1, 2) have stressed changes in the volumes and mechanical properties of the lungs following radiation, but these studies were performed on animals or on patients free of chronic obstructive pulmonary disease. Almost all of the patients in this study had chronic obstructive lung disease in addition to carcinoma. Our failure to demonstrate significant changes in the volumes and mechanical properties might be attributed to the presence of chronic obstructive lung disease. It is also possible that cessation of smoking masked any effects of radiation on these functions. The results suggest a change in the efficiency of ventilation as shown by lessening of alveolar hyperventilation following radiation. No mechanism is obvious to explain this finding. The data also indicate that there is a decrease in the effective surface area for alveolar gas exchange following radiation as a result of radiation pneumonitis.

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Abstract 11

Respiratory Disorder in Cystic Fibrosis.

George Polgar, M.D. The Children's Hospital of Philadelphia.

The lung disease in cystic fibrosis of the pancreas is intimately related to the basic disorder: a generalized disturbance in the function of exocrine glands.

The primary cause of the respiratory symptoms is the accumulation of highly viscous mucus within the airways. This leads to secondary changes such as patchy atelectasis, emphysema, and peribronchial fibrosis. The functional consequences of these are air trapping, increased airway resistance, decreased lung compliance, abnormal ventilation perfusion ratios, increased venous admixture, and finally, respiratory insufficiency with hypoxia and hypercapnia.

The clinical course of the disease is marked by exacerbations which may be triggered by infections or other unknown factors. During exacerbations the patients who had a relatively constant degree of functional abnormalities before, frequently cross the borderline into respiratory insufficiency. The prognosis of individual exacerbations is unpredictable.

The diagnosis of the lung disease is essentially the same as that of cystic fibrosis in general and it is based on the sweat test. The radiological picture is non-specific, but it might help in differential diagnosis.

Therapeutic suggestions have been numerous, but objective evidence for their usefulness is scarce. Maximal amount of physical and mental care is important. In exacerbations, symptomatic support of the respiratory, circulatory and metabolic functions are indicated. Advantages and limitations of oxygen breathing and artificial respiration have to be considered. Temporary bypass of the respiratory organs would be an ideal solution.

Abstract 12

Present Knowledge of Lung Clearance.

Heinrich Brieger, M.D., Department of Preventive Medicine, Jefferson Medical College.

Pulmonary clearance is a function of both the upper and the lower respiratory tract. True alveolar clearance has been studied only recently after having been recognized as a most important factor in the development of pneumoconioses. In the period immediately following one exposure to dust, solid particles (insoluble or of low solubility) are transferred rapidly to the stomach by phagocytosis, mucus flow, and ciliary action. The clearance rate does not depend on solubility, but mainly on particle size and initial lung burden. The latter determines the degree of phagocytosis, now recognized as instrumental in moving particles from the lung and not primarily into the lung.

Transfer to the stomach continues beyond the early post-exposure period at an increasingly slower rate. Simultaneously, removal to

the regional lymph nodes takes place. The manner in which the latter occurs is still a controversial subject. Insufficient filtering by, or ulceration of, lymph nodes may lead to hematogenous dissemination.

After repeated exposure over long periods of time, as encountered in industry, very large quantities of dust are removed. Dusts that are not cytotoxic may be virtually eliminated after termination of exposure. Cytotoxic dusts, however, may form considerable permanent deposits in plaques and nodules.

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Editor, Transactions & Studies

FRED B. ROGERS

Curator, Mütter Museum; Custodian, College Collections

ELLA N. WADE

Superintendent

THEODORE J. KOLODZIEJSKI

Fellows

February 5, 1965

ELECTED

1952. Abelson, Neva Martin, 32 Woodale Rd. (18)
1961. Adamson, William C., 1542 Susquehanna Rd., Rydal, Pa.
1926. Adler, Francis Heed, 313 S. 17th St. (3)
1959. Adlin, Albert, 1512 Lindley Ave. (41)
1949. Aegerter, Ernest E., 3400 N. Broad St. (40)
1953. Agerty, Horst A., 1111 N. 63rd St. (19151)
1960. Ainsworth, Thomas H., Jr., 960 County Line Rd., Bryn Mawr, Pa.
1964. Albert, Seymour M., 255 S. 17th St. (19103)
1963. Albright, Edwin P., 512 E. Mt. Airy Ave. (18)
1958. Alexander John Deaver, Philadelphia General Hospital (4)
1962. Alexander, John Dewey, Jr., 330 S. 9th St. (7)
1935. Alpers, Bernard J., 111 North 49th St. (39)
1960. Ames, Mary D., 260 St. James Place. (6)
1961. Amsterdam, Gerald H., Wyncote House, Wyncote, Pa.
1962. Annesley, William H., Jr., 39 Glendale Road, Upper Darby, Pa.
1961. Anthony, Russell A., 385 Lancaster Ave., Haverford, Pa.
1961. Aponte, Gonzalo E., 1025 Walnut St. (7)
1930. Appel, Kenneth E., 111 N. 49th St. (39)
1905. Appelman, Leighton Francis, 308 S. 16th St. (2)
1960. Arey, James B., 2600 N. Lawrence St. (33)
1959. Arkless, Henry A., 255 S. 17th St. (3)
1922. Arnett, John H., 2116 Pine St. (3)
1952. Ash, Rachel, 255 S. 17th St. (3)
1952. Aston, Melville J., Garden Court Plaza, 47th & Pine Sts. (43)
1944. Atkins, Joseph P., 1201 Knox Rd., Wynnewood, Pa.
1956. Atkinson, John B., Chestnut & Copley Rds., Upper Darby, Pa.
1935. Atlee, John L., Jr., 37 E. Orange St., Lancaster, Pa.
1952. Atlee, William A., 37 E. Orange St., Lancaster, Pa.
1963. Austrian, Robert, Hospital of the University of Pennsylvania (4)
1958. Ayella, Alfred S., Jr., 1213 S. Broad St. (47)
1960. Bacon, Catherine L., 504 Howe Rd., Merion Station, Pa.
1937. Bacon, Emily P., Lankenau Medical Bldg. (19151)
1960. Bacon, Harry E., 255 S. 17th St. (3)
1958. Baer, Samuel, 5123 N. Broad St. (41)
1959. Baird, Henry Welles, III, 2600 N. Lawrence St. (33)
1952. Baier, Howard N., 3401 N. Broad St. (40)
1952. Baker, Howard W., 3401 N Broad St. (40)
1963. Baker, Richard B., 1851 E. Allegheny Ave. (34)
1946. Baker, Walter W., 255 S. 17th St. (3)
1963. Balin, Howard, 330 S. 9th St. (7)
1957. Baltzell, William Hewson, 1530 Locust St. (2)
1940. Barba, Philip S., 120 Erdenheim Road (18)
1943. Barden, Robert P., 8835 Germantown Ave. (18)
1939. Barnshaw, Harold D., 526 Cooper St., Camden 2, N. J.
1957. Barr, S. Stanley, 255 S. 17th St. (3)
1939. Bartle, Harvey, Jr., Glenbrook Medical Bldg., 864 County Line Rd., Bryn Mawr, Pa.

1963. Bartuska, Doris G., Woman's Medical College (19129)
1963. Bassett, James G., 3300 Henry Ave. (19129)
1932. Batson, Oscar V., 3926 Pine St. (4)
1921. Bauer, Edward L., Alden Park Manor (44)
1933. Bauer, John T., 312 E. Second St., Moorestown, N. J.
1939. Baumann, Frieda, 200 N. Wynnewood Ave., Wynnewood, Pa.
1930. Beardwood, Joseph T., Jr., 1201 Ansley Ave. (26)
1952. Bedrossian, E. Howard, 4501 State Rd., Drexel Hill, Pa.
1949. Beecham, Clayton T., 105 West School Lane (44)
1935. Beerman, Herman, 255 S. 17th St. (3)
1942. Behrend, Albert, 1018 Melrose Ave. (26)
1945. Behrend, Bernard, 5910 Greene St. (44)
1934. Behrend, Moses, Rittenhouse Claridge, 18th & Walnut St. (3)
1949. Beizer, Lawrence H., 419 South 19th St. (46)
1930. Belk, William Parks, 433 Owen Rd., Wynnewood, Pa.
1936. Bell, Benjamin Tertius, 1941 Woodland Rd., Abington, Pa.
1956. Beller, Martin Leonard, 1936 Spruce St. (3)
1947. Bellet, Samuel, 2021 Spruce St. (3)
1956. Belmont, Owen, 5723 No. Park Ave. (41)
1959. Berk, Nathaniel G., 2534 W. Cheltenham Ave. (50)
1951. Bernstine, J. Bernard, 255 S. 17th St. (3)
1960. Bernstine, Melvin Lewis, 1543 Marmont Lane, Los Angeles 46, Cal.
1956. Berry, Theodore J., 331 E. Lancaster Ave., Wynnewood, Pa.
1957. Biele, Albert M., 1530 Locust St. (2)
1964. Biele, Flora H., 1530 Locust St. (19102)
1918. Billings, Arthur E., 2020 Spruce St. (3)
1957. Birdsall, Thomas M., 255 S. 17th St. (3)
1949. Bishop, Edward H., 811 Spruce St. (7)
1933. Bishop, Paul A., 1347 Waverly Rd., Gladwyne, Pa.
1944. Blady, John V., Parkway House, 2201 Benjamin Franklin Pkwy. (30)
1960. Blake, Alton D., Jr., Bryn Mawr Medical Bldg., Bryn Mawr, Pa.
1952. Blake, Paul O., 273 N. Lansdowne Ave., Lansdowne, Pa.
1958. Blakemore, William S., 419 S. 19th St. (46)
1917. Block, Frank B., A1124 Park Drive Manor (44)
1957. Block, Louis H., 1351 Tabor Rd. (41)
1963. Block, Reuben, 1555 Haddon Ave., Camden, N. J.
1949. Blumstein, George I., 2039 Delancey St. (3)
1929. Bockus, Henry L., 250 S. 18th St. (3)
1962. Boggs, Thomas R., Jr., Children's Hospital, 1740 Bainbridge St. (46)
1928. Boles, Russell S., Rittenhouse Plaza, 1901 Walnut St. (3)
1923. Bond, Earl D., Bryn Mawr Court, Bryn Mawr, Pa.
1961. Bongiovanni, Alfred M., 1740 Bainbridge St. (46)
1948. Bookhammer, Robert S., 264 Forrest Rd., Merion, Pa.
1931. Bortz, Edward Le Roy, Lankenau Medical Bldg. (19151)
1936. Bostwick, Delazon Swift, 1523 Sweetbriar Rd., Gladwyne, Pa.
1947. Bourland, Henry S., 2219 Garret Rd., Drexel Hill, Pa.
1961. Bouzarth, William F., 3300 Henry Ave. (29)
1961. Bove, Frank A., 2301 Pennsylvania Ave. (30)
1954. Bowers, Paul A., 2031 Locust St. (3)
1942. Bowie, Morris A., Bryn Mawr Medical Bldg., Bryn Mawr, Pa.
1963. Boyer, Randal A., Holy Redeemer Hospital, Meadowbrook, Pa.
1964. Brackin, John T., Jr., Abington Memorial Hospital, Abington, Pa.
1959. Brady, Luther W., 230 N. Broad St. (19102)

1954. Bralow, S. Philip, 3701 N. Broad St. (40)
1942. Branen, William T., Whitby & Cypress Aves., Yeadon, Pa.
1921. Bransfield, John W., 2031 Locust St. (3)
1948. Braun, William, 406 Cooper St., Camden, N. J.
1953. Brav, Solomon S., 5575 N. Park Ave. (41)
1953. Breckenridge, Robert L., Our Lady of Lourdes Hosp., 1600 Haddon Ave., Camden 3, N. J.
1964. Brenman, Arnold K., 3701 N. Broad St. (19140)
1961. Breslow, Irwin H., 1924 Panama St. (19103)
1946. Briscoe, Clarence Conway, 811 Spruce St. (7)
1953. Brobeck, John R., Univ. of Pa. School of Medicine (4)
1958. Brody, Henry, Einstein Medical Center, York & Tabor Rds. (41)
1965. Brody, Jerome I., Graduate Hospital, 19th & Lombard Sts. (19146)
1952. Brody, Morris W., 1930 Chestnut St. (3)
1948. Brogan, Edmund J., 1020 Cedargrove Rd., Wynnewood, Pa.
1953. Brooke, John A., 1431 Spruce St. (2)
1958. Brooks, Frank P., Hospital of the Univ. of Pa. (4)
1936. Brown, Clark E., Lancaster Ave. & City Line Ave. (19151)
1932. Brown, Claude P., 1930 Chestnut St. (3)
1963. Browne, Laurence T., Presidential Apts., D126 (19131)
1961. Brunt, Manly Y., 111 N. 49th St. (39)
1939. Brust, Raymond M., 4710 Chester Ave. (43)
1953. Bucher, Robert M., 3401 N. Broad St. (40)
1961. Buerk, Minerva S., Bryn Mawr Medical Bldg., Bryn Mawr, Pa.
1952. Bumgardner, Heath D., 13 S. Main St., Cape May Court House, N. J.
1962. Burgoon, Carroll F., Jr., 804 Pine St. (7)
1940. Burnett, W. Emory, 3401 N. Broad St. (40)
1962. Burney, Leroy E., 3400 N. Broad St. (40)
1954. Burros, Harry M. 419 S. 19th St. (46)
1941. Butler, Miriam, Watersmeet, Glen Mills, Pa.
1957. Butterworth, Thomas, 411 Walnut St., Reading, Pa.
1957. Calhoun, John Alfred, Jr., 214 Elm Ave., Swarthmore, Pa.
1958. Cameron, Charles S., 235 N. 15th St. (2)
1962. Camishion, Rudolph C., 1025 Walnut St. (7)
1952. Campbell, Edward W., Abington Memorial Hospital
1944. Campion, Richard J., Box 136 Springhouse, Ambler, Pa.
1964. Cancelmo, Jesse J., Jr., 337 W. Lancaster Ave., Wayne, Pa.
1931. Cantarow, Abraham, 1025 Walnut St. (7)
1935. Carey, Lawrence S., 2241 Garrett Road, Drexel Hill, Pa.
1931. Cariss, Walter L., 51 N. 39th St. (4)
1930. Carpenter, Chapin, 502 Chestnut Lane, Wayne, Pa.
1959. Carrington, Elsie R., Woman's Medical College (29)
1960. Carroll, Robert T., 1015 Sansom St. (7)
1917. Carson, John B., Newtown Square, Pa.
1956. Carty, James Byron, 51 Hampden Rd., Upper Darby, Pa.
1956. Casey, Paul R., 8350 Roosevelt Blvd. (15)
1937. Castallo, Mario A., 1621 Spruce St. (3)
1943. Castigliano, S. Gordon, 853 Mt. Pleasant Rd., Bryn Mawr, Pa.
1949. Caswell, H. Taylor, 3401 N. Broad St. (40)
1954. Catenacci, Alfred J., 343 Winding Way, Merion Station, Pa.
1954. Cathcart, Richard T., Jefferson Hospital, 1025 Walnut St. (7)
1957. Cattie, Vincent J., 8040 Roosevelt Blvd., (19152)
1950. Chamberlain, Richard H., 3400 Spruce St (4)

1939. Chamberlin, George W., Reading Hospital, Reading, Pa.
1900. Chance, Burton, Our Lady Help of Christians Convalescent Home, 56th & City Line Ave. (19131)
1945. Chance, Burton, Jr., 8236 Germantown Ave. (18)
1958. Channick, Bertram J., 3701 N. Broad St. (40)
1954. Charny, Charles W., 2039 Delancey Pl. (3)
1960. Chirico, Anna-Marie, Hosp. of Univ. of Pa. (4)
1947. Chouké, Kehar S., P. O. Box 5447, Kecoughtan Station, Hampton, Va.
1945. Cianfrani, Theodore, 1930 Chestnut St. (3)
1939. Ciccone, Emmet F., 2021 Murray St. (15)
1960. Cinquino, Mario A., 1518 S. Broad St. (46)
1960. Clader, Stanley C., 825-A Glenbrook Ave., Bryn Mawr, Pa.
1951. Clagett, Augustus H., Jr., 1618 N. Broom St., Wilmington 6, Del.
1962. Clark, James E., 1015 Chestnut St. (7)
1951. Clark, John K., 36th & Spruce Sts. (4)
1947. Clark, Thomas Williams, 218 W. Chestnut Hill Ave. (18)
1963. Cleveland, Albert F., 615 Morgan Ave., Drexel Hill, Pa.
1958. Closson, Edward W., 2320 S. Broad St. (45)
1910. Cloud, J. Howard, Alden Park Manor (19144)
1949. Cohen, Louis B., 1320 Arrott St. (24)
1953. Cohen, Robert V., 520 Spring Ave., Elkins Park 17, Pa.
1964. Cohn, Herbert E., 1025 Walnut St. (19107)
1934. Collins, Leon Howard, Jr., 133 S. 36th St. (4)
1943. Colonna, Paul C., 133 S. 36th St. (4)
1949. Conger, Kyril B., 3401 N. Broad St. (40)
1961. Coon, Juluis M., 1025 Walnut St. (7)
1945. Coonel, Pauline, 47 E. Mt. Pleasant Ave. (19)
1930. Cooper, David A., 1520 Spruce St. (2)
1953. Cooper, Donald R., Woman's Medical College, 3300 Henry Ave. (29)
1960. Cooper, Edward Sawyer, 6710 Lincoln Drive (19)
1947. Coppolino, John F., 1807 S. Broad St. (45)
1952. Corbit, John D., Jr., 3717 Chestnut St. (4)
1959. Cormeny, George F., 3818 Chestnut St. (4)
1941. Cornelius, Chalmers E., 119 Summit Ave., Jenkintown, Pa.
1911. Cornell, Walter S., Board of Public Education, Parkway and 21st St. (3)
1914. Corson, Edward F., 3047 Spring Mill Rd., Plymouth Meeting, Pa.
1959. *Cowan, Capt. John S., MC, USN, Commanding Officer, U. S. Naval Hospital (19145)
1940. Cowan, Thomas H., 1930 Chestnut St. (3)
1947. Crane, A. Reynolds, Pennsylvania Hospital (7)
1937. Crane, Martin P., 4701 Pine St. (43)
1952. Crellin, J. Antrum, 1930 Chestnut St. (3)
1955. Crist, Walter A., 211 N. 5th St., Camden, N. J.
1963. Crosley, Archer P., Jr., The Presbyterian Hospital (4).
1921. Crossan, Edward T., Buttonwood Hall, Conshohocken, Pa.
1959. Cullen, Milton L., 1936 Cottman Ave. (19111)
1962. Cunningham, John D., 3400 Spruce St. (4)
1934. Custer, R. Philip, 643 Moreno Road, Narberth, Pa.
1958. D'Alonzo, Walter A., 1647 S. 15th St. (45)
1938. Dannenberg, Arthur M., Sr., 235 S. 15th St. (2)
1951. Daugherty, Earl A., 2818 W. Girard Ave. (30)

* Military Service.

1953. Davie, John H., 37 S. 20th St. (3)
1947. Davis, C. Nelson, 524 Howe Rd., Merion Station, Pa.
1936. Davis, David M., 960 County Line Rd., Bryn Mawr, Pa. (19010)
1957. Davis, John Evan, Tedwyn Apts., 840 Montgomery Ave., Bryn Mawr, Pa.
1951. Davis, J. Wallace, 135 S. 18th St. (3)
1961. Dawber, Bryan A., Penn Mutual Life Insurance Co. (5)
1963. Day, H. James, Temple University Hospital (19140)
1935. Deaver, J. Montgomery, Lankenau Medical Bldg. (19151)
1957. Decker, John Paul, Pennsylvania Hospital (7)
1957. Dees-Porch, Frances, Glendale Road & Chestnut Sts., Upper Darby, Pa.
1947. Dehne, Theodore L., Adams Avenue and Roosevelt Blvd. (24)
1935. Deibert, Irvin Elmer, 538 Cooper St., Camden, N. J.
1958. Deitz, George W. III, 2240 Pine Rd., Huntingdon Valley, Pa.
1955. De Long, Samuel L., 860 Lancaster Ave., Bryn Mawr, Pa.
1952. DeLuca, Charles Q., 255 S. 17th St. (3)
1952. De Orsay, Ralph H., 1241 Lindale Ave., Drexel Hill, Pa.
1951. De Palma, Anthony F., 248 S. 21st St. (3)
1963. Derham, Robert J., McClatchy Bldg., Upper Darby, Pa.
1959. DeTuerk, John J., 1930 Chestnut St. (3)
1959. Dickens, Helen O., P. O. Box 9336 (39)
1958. Dickstein, Benjamin, 6810 Castor (24)
1956. Dietrich, Herbert James, Jr., Hospital of the University of Pennsylvania (4)
1952. Digilio, Victor A., 2200 St. James Place (17)
1963. DiMarino, Anthony J., 735 Delaware St., Paulsboro, N. J.
1960. Dinon, Louis R., 330 S. 9th St. (7)
1920. Doane, Joseph C., 617 W. Hortter St. (19)
1948. Dohan, Francis Curtis, 80 Princeton Road, Cynwyd, Pa.
1954. Donaldson, James B., 1901 Walnut St. (3)
1946. Donnelly, Andrew J., 33rd and Powelton Ave. (4)
1933. Donnelly, Joseph C., 7955 Castor Ave. (15)
1937. Donnelly, Robert T. M., 5205 N. Broad St. (41)
1962. Dorman, Philip J., Fidelity Mutual Life Insurance Co. (1)
1954. Downing, Daniel F., 8864 Norwood Ave. (18)
1964. Dratman, Mary B., Woman's Medical College, Henry Ave. & Abbottsford Road (19129)
1952. Drayer, Calvin S., 111 N. 49th St. (39)
1949. Dripps, Robert D., 3400 Spruce St. (4)
1944. Dublin, George J., 1930 Chestnut St. (3)
1944. Dugger, John H., Episcopal Hospital (25)
1935. Duncan, Garfield G., 330 S. 9th St. (7)
1953. Dupler, Donald A., 4028 Walnut St. (4)
1942. Durant, Thomas M., 3401 N. Broad St. (40)
1942. Dyer, W. Wallace, Bryn Mawr Medical Bldg., Bryn Mawr, Pa.
1962. D'Zmura, Thomas L., Presidential Apts., City Line Ave. & Presidential Blvd. (19131)
1936. Easby, Mary Hoskins, R. D. 1, Burlington, Vt.
1948. Eaton, Francis H., 4007 Chestnut St. (39)
1964. Eberlein, Walter R., 1740 Bainbridge St. (19146)
1964. Eckenhoff, James E., 3400 Spruce St. (19104)
1937. Edeiken, Joseph, 2130 Delancey Pl. (3)
1944. Eger, Sherman A., 255 S. 17th St. (3)
1944. Ehrich, William E., 540 W. Hortter St. (19)
1956. Eiman, John W., Abington Memorial Hospital, Abington, Pa.
1962. Eisenberg, Samuel W., 3536 N. Broad St. (40)
1959. Eisenhower, James S. D., Jr., 2704 Pacific Ave., Wildwood, N. J.

1958. Eisman, Sylvan H., 3600 Spruce St. (4)
1959. Elias, Elmer J., 10 Monticello Ave., Trenton, N. J.
1949. Elkinton, J. Russell, Oak Lane, Moylan, Pa.
1961. Elliott, Frank A., 807 Spruce St. (7)
1957. Ellis, Richard A., 255 S. 17th St. (3)
1955. Ellis, Samuel, 541 S. 46th St. (43)
1939. Ellis, Van Mashburn, 1528 Spruce St. (2)
1928. Ellison, Richard T., Medical Office Bldg., 1245 Highland Ave., Abington, Pa. (19001)
1936. Ellson, J. Vernon, Glendale Road & Chestnut St., Upper Darby, Pa.
1937. Elsom, Kendall A., Scott Paper Co. (13)
1932. Engel, Gilson C., Lankenau Medical Bldg. (19151)
1945. English, O. Spurgeon, 449 Righters Mill Rd., Narberth, Pa.
1942. Erb, William H., 133 S. 36th St. (4)
1957. Erdman, William James, II, 3400 Spruce St. (4)
1950. Ersner, Matthew S., 1915 Spruce St. (3)
1957. Etzl, Michael M., 9025 Frankford Ave. (14)
1954. Evans, William W., Box 2, Bryn Mawr, Pa.
1955. Eynon, Harold K., Route 70 at East Gate, Barclay Farm, Haddonfield, N. J.
1946. Farell, David M., 1912 Spruce St. (3)
1903. Farr, Clifford B., Railroad Ave. & County Line Rd., Bryn Mawr, Pa.
1945. Farrar, George Elbert, Jr., 528 Scott Rd., Gladwyne, Pa.
1953. Farrell, Harry L., 1930 Chestnut St. (3)
1930. Farrell, John T., Jr., 255 S. 17th St. (3)
1964. Faust, Herbert A., 245 N. Broad St. (19107)
1935. Ferguson, Lewis Kraeer, 419 S. 19th St. (46)
1936. Fetter, Ferdinand, 322 S. 21st St. (3)
1945. Fetter, John S., 842 Worrell Rd., Jenkintown, Pa.
1935. Fetter, Theodore R., 255 S. 17th St. (3)
1952. Fields, Harry, 133 S. 36th St. (4)
1959. Fineberg, Charles, 255 S. 17th St. (3)
1955. Finestone, Albert J., 3701 North Broad St. (40)
1960. Finkbiner, Rodman B., 811 Spruce St. (7)
1943. Finkelstein, Arthur, K. Graduate Hospital (46)
1955. Finkelstein, David, 419 S. 19th St. (46)
1955. Finley, John K., 527 Welsh St., Chester, Pa.
1954. Finn, Joseph L., 8014 Burholme Ave. (11)
1947. First, Arthur, 1714 Spruce St. (3)
1954. Fischer, Carl C., Girard College (21)
1950. Fischer, H. Keith, 100 W. Coulter St. (44)
1962. Fisher, George R., III, 801 Spruce St. (7)
1958. Fisher, Robert M., 118 Airdale Rd., Rosemont, Pa.
1956. Fite, Franklin K., Germantown Hospital (44)
1952. Fitts, William T., Jr., 3400 Spruce St. (4)
1952. Flexner, Louis B., 248 Anatomy-Chemistry Bldg., Univ. of Pa. (4)
1928. Flick, John B., 819 Black Rock Rd., Gladwyne, Pa.
1939. Flippin, Harrison F., Lankenau Hospital (51)
1957. Fornwalt, George R., 47 Copley Rd., Upper Darby, Pa.
1954. Forster, H. Walter, Jr., 37 S. 20th St. (3)
1960. Foulger, John H., 601 Rockwood Rd., Wilmington, Del. (2)
1941. Fox, C. Calvin, 1806 Spruce St. (3)
1963. Fox, Eva F., Woman's Medical College (19129)
1963. Frank, Paul E., York Road & Summit Ave., Hatboro, Pa.
1963. Frank, Robert L., 514 Cooper St., Camden 2, N. J.

1959. Frankel, Kalman, 1424 Pepper Rd., Rydal, Pa.
1955. Frayer, William C., 37 S. 20th St. (3)
1941. Frazier, William Doane, 419 Gilpin Rd., Narberth, Pa.
1952. Freed, Herbert, 255 S. 17th St. (3)
1956. Freeman, Joseph T., 8-A Rittenhouse Plaza (3)
1963. Freiman, Henry D., 1500 Hellerman St. (49)
1958. Freiwald, Milton J., 222 S. 19th St. (3)
1964. French, Gordon N., Misericordia Hospital (19143)
1955 Friedenberg, Zachary B., 133 S. 36th St. (4)
1951 Friedman, Paul Sigmund, 1422 Chestnut St. (2)
1960. Friedman, Sidney, 1740 Bainbridge St. (46)
1958. Frisch, Frederick, 888 Glenbrook Ave., Bryn Mawr, Pa.
1937. Fritz, Herbert H., Pennswood Rd., Bryn Mawr, Pa.
1961. Frobese, Alfred S., Abington Memorial Hosp., Abington, Pa.
1953. Fruchter, Joseph M., The Philadelphian, 2401 Pennsylvania Ave. (19130)
1940. Fry, Kenneth E., 1719 Rittenhouse Sq. (3)
1935. Fry, Wilfred Eyles, 1930 Chestnut St. (3)
1963. Furgiuele, Francis P., 5430 Greene St. (19144)
1937. Furlong, Thomas F., Jr., Times Medical Building, Ardmore, Pa.
1964. Galligan, William J., 2909 Garrett Road, Drexel Hill, Pa.
1954. Gambescia, Joseph M., 1422 Race St. (2)
1951. Garlichs, Richard W., 216 N. Monoa Road, Havertown, Pa.
1931. Garner, Vaughn C., 447 East Wadsworth St. (19)
1953. Garnet, James D., 807 Spruce St. (7)
1959. Gartland, John J., 269 S. 19th St. (3)
1950. Garvin, Eugene J., 533 S. 46th St. (43)
1952. Gefter, William I., 1900 Rittenhouse Square (3)
1935. Geist, Donald C., 301 E. City Line, Bala-Cynwyd, Pa.
1955. Gelfand, David, 1722 Pine St. (3)
1965. Georges, Thomas W., Jr., 3401 N. Broad St. (19140)
1954. German, George B., 429 Cooper St., Camden, N. J.
1941. Gershon-Cohen, J., 255 S. 17th St. (3)
1959. Gerson, Irvin M., Cedarbrook Apts., Cedarbrook Hills, Wyncote, Pa. (19095)
1955. Gettes, Bernard C., 128 Overhill Rd., Cynwyd, Pa.
1963. Giambalvo, Giacchino P., 818 N. 63rd St. (19151)
1965. Gianakon, Harry G., 111 N. 49th St. (19139)
1934. Gibbon, John H., Jr., 1025 Walnut St. (7)
1939. Gibson, Glen Gregory, 2031 Locust St. (3)
1944. Gifford, Edward S., Jr., 1913 Spruce St. (3)
1956. Gilbert, Philip D., Cooper Hospital, Camden, N. J.
1947. Giletto, Basil J., 2020 Locust St. (3)
1940. Gill, A. Bruce, 1603 Normandy Drive, Mt. Dora, Fla.
1955. Gill, Robert J., 801 Spruce St. (7)
1922. Gilmour, William R., 6616 Woodland Ave. (42)
1952. Gilpin, Sherman F., Jr., 1023 Beury Building, 3701 N. Broad St. (40)
1963. Gindhart, Floyd D., 1213 Hamilton Avenue, Trenton, N. J.
1949. Ginsburg, Isadore W., 3401 N. Broad St. (40)
1958. Girsh, Leonard S., 3701 N. Broad St. (40)
1954. Gislason, Gerhard J., 245 N. Broad St. (7)
1964. Gloeckner, M. Louise C., 110 E. Fourth Ave., Conshohocken, Pa.
1962. Gold, David A., 5587 N. Park Ave. (41)
1956. Goldberg, Harry, 7913 Rolling Green Rd., Cheltenham, Pa.
1958. Golub, Leib J., 136 S. 16th St. (2)

1963. Goluboff, Bernard, 1800 Delancey Place (19103)
1965. Goodman, David H., 6816 Castor Ave. (19149)
1956. Goracci, Armando F., 2040 Poplar St. (30)
1937. Gordon, William, 5345 Spruce St. (39)
1964. Gottlieb, Harry, 5603 Greene St. (19144)
1964. Gottlieb, Philip M., 818 Medical Arts Bldg., 16th & Walnut Sts. (19102)
1956. Gouley, Benjamin, 5577 N. Park Ave. (41)
1957. Grahn, Henry Victor, 5132 Chester Ave. (43)
1926. Grant, Francis Clark, 750 Germantown Pike, Lafayette Hill, Pa.
1965. Grassi, Michael O. A., 2038 Locust St. (19103)
1940. Greene, Lloyd B., 803 Spruce St. (7)
1952. Greening, Roy R., Dept. of Radiology, Jefferson Hospital (7)
1958. Greenspan, Benjamin, 1319 W. Tabor Rd. (41)
1955. Greenstein, Raphael H., 1710 Pine St. (3)
1941. Groff, Robert A., Univ. of Pa. Hospital (4)
1952. Grotzinger, Paul J., 2121 Valley Rd., Huntingdon Valley, Pa.
1952. Grove, D. Dwight, 230 N. Broad St. (2)
1945. György, Paul, Univ. of Pa. School of Medicine (4)
1935. Hadden, Samuel B., 250 S. 18th St. (3)
1951. Hafkenschiel, Joseph H., Jr., 13 St. Asaph Rd., Bala-Cynwyd, Pa.
1945. Hahn, George A., 255 S. 17th St. (3)
1964. Hall, John H., 3401 N. Broad St. (19140)
1955. Hallahan, John D., 104 W. Front St., Media, Pa.
1951. Hallett, Joseph W., 136 S. 16th St. (2)
1961. Hammett, Van Buren O., 249 N. Broad St. (19107)
1959. Hampton, Louis J., 1025 Walnut St. (7)
1954. Hand, B. Marvin, 1801 Pennsylvania Blvd. (3)
1938. Hand, John G., 1724 Pine St. (3)
1964. Hanes, Robert B., 501 Long Lane, Upper Darby
1947. Hanes, William James, 218 E. Beechtree Lane, Wayne, Pa.
1963. Hanhausen, Edward H., 418 E. Lancaster Ave., Wayne, Pa.
1950. Hansen, A. Victor, 910 Centennial Rd., Penn Valley, Narberth, Pa. (19072)
1957. Harasym, Emil L., 5416 North 5th St. (20)
1956. Harbert, Frederick, Jefferson Hospital (7)
1952. Harer, W. Benson, State Rd. & Rogers Ave., Bywood, Pa.
1951. Harkins, Herbert P., 1930 Chestnut St. (3)
1963. Harris, Charles, 5301 Old York Road (41)
1962. Harris, James R., Philadelphia General Hospital (4)
1959. Harris, James S. C., 5401 Wayne Ave. (44)
1948. Harris, T. N., 5112 Woodbine Ave. (31)
1929. Harrison, Francis G., 1900 Spruce St. (3)
1964. Hart, Alonzo, W., 847 N. 63rd St. (19151)
1926. Hartmann, Fred I., 1914 Pine St. (3)
1946. Harvey, Edith E., 406 York Rd., Jenkintown, Pa.
1947. Harvey, Rolfe Marsh, 669 Mill Rd., Villanova, Pa.
1961. Harvie, Fred H., 3400 Spruce St. (4)
1935. Haskell, Benjamin F., 1427 Spruce St. (2)
1958. Haupt, George J., Lankenau Medical Bldg. (51)
1960. Hausman, David H., Pennsylvania Hospital, 8th & Spruce Sts. (7)
1947. Havens, Walter Paul, Jr., 139 Cheswold Lane, Haverford, Pa.
1963. Hayes, Merrill B., 710 Madison St., Chester, Pa.
1952. Hayllar, Benjamin L., 803 Spruce St. (7)
1961. Hayward, Malcolm L., 111 N. 49th St. (39)

1961. Heath, Frederick K., Merck, Sharp and Dohme, West Point, Pa.
1964. Heath, Robert D., Lankenau Medical Bldg. (19151)
1957. Hedges, Thomas R., Jr., 330 South 9th St. (7)
1961. Heggestad, Gilman E., Conestoga Medical Bldg., Bryn Mawr, Pa.
1965. Heil, Charles G., Jr., 800 N. Easton Road, Willow Grove, Pa.
1944. Herbut, Peter A., Dept. of Pathology, Jefferson Medical College Hospital (7)
1954. Herron, James R., 1486 Haddon Ave., Camden 3, N. J.
1963. Hesch, Joseph A., Misericordia Hospital (19143)
1949. Heyl, W. Meredith, 100 W. Coulter St. (44)
1956. Hildreth, Eugene A., Hospital of the University of Pennsylvania (4)
1961. Hilferty, Daniel J., Jr., Sutton Terrace Apts., 50 Belmont Ave., Bala-Cynwyd, Pa.
1952. Hinkson, DeHaven, 329 N. 40th St. (4)
1962. Hinman, E. Harold, 1025 Walnut St. (7)
1924. Hirst, John C., 2d., 1821 Spruce St. (3)
1943. Hitschler, William J., Bethlehem Pike & Summit (18)
1944. Hneleski, Ignatius S., 802 S. 48th St. (43)
1943. Hockaday, Agnes, 316 Shadeland Ave., Drexel Hill, Pa.
1939. Hodes, Philip J., Dept. of Radiology, Jefferson Medical College (7)
1947. Hodges, John H., 1025 Walnut St. (7)
1963. Hoffman, Carl J., 2901 Cottman Ave. (19149)
1959. Hoffman, Francis H., 3401 N. Broad St. (40)
1948. Hoffman, George L., Jr., 133 S. 36th St. (4)
1965. Holfelner, Edward D., Chestnut St. & Ashby Road, Upper Darby, Pa.
1954. Hollander, George, 3500 Vista St. (36)
1949. Hollander, Joseph L., 36th & Spruce Sts. (4)
1964. Holling, Herbert E., 3400 Spruce St. (19104)
1951. Hollis, Charles B., 28 W. School Lane (44)
1952. Holloway, Edward E., 1736 Pine St. (3)
1949. Hopkins, Henry U., Garden Court Plaza, 47th & Pine Sts. (43)
1953. Horan, Charles A., 734 N. 63rd St. (19151)
1946. Horan, Gerald W., Marple-Newtown Medical Bldg., Newtown Square, Pa.
1947. Horwitz, Orville, Hospital of the University of Pennsylvania (4)
1950. Houlihan, Carl T., 207 McClatchy Bldg., Upper Darby, Pa.
1944. Housel, Edmund L., 255 S. 17th St. (3)
1928. Houser, Karl Musser, 836 Bryn Mawr Ave., Narberth, Pa.
1958. Howard, John M., 230 N. Broad St. (2)
1964. Howell, Doris A., 3300 Henry Ave. (19129)
1948. Howland, Alvin Wilcox, School Lane House (44)
1946. Howson, John Yeatts, 316 Lancaster Ave., Wayne, Pa.
1951. Hubbard, John P., 133 S. 36th St. (19104)
1947. Huber, John Franklin, Temple University School of Medicine (40)
1937. Hughes, Joseph, 111 N. 49th St. (39)
1939. Hughes, P. Boland, 419 Hillbrook Rd., Bryn Mawr, Pa.
1951. Hundley, J. Warren, 3818 Chestnut St. (4)
1954. Hunsicker, William C., Jr., 255 S. 17th St. (3)
1946. Hunt, William T., Jr., 6 Penn Center Plaza (3)
1921. Hunter, Robert John, 928 N. 63rd St. (19151)
1952. Hyman, Harold L., 3401 N. Broad St. (40)
1950. Imbriglia, Joseph E., 329 Shadeland Ave., Drexel Hill, Pa.
1949. Ingraham, Norman R., Jr., Stenton and Whitemarsh Aves. (18)
1957. Isaacson, Howard, Haverford Ave. & Drexel Rd. (19151)
1951. Isard, Harold J., Albert Einstein Medical Center, 5th & Reed Sts. (47)
1951. Israel, Harold L., 304 S. 19th St. (3)

1947. Israel, S. Leon, 807 Spruce St. (7)
1947. Jaeger, Rudolph, Jefferson Bldg., 1015 Chestnut St. (7)
1941. Jeffers, William A., 503 Owen Road, Wynnewood, Pa.
1965. Jenkins, B. Wheeler, 1526 E. Upsal St. (19150)
1943. Johnson, Julian, 3400 Spruce St. (4)
1959. Johnson, Robert G., 1015 Walnut St. (7)
1938. Johnson, Thomas A., 135 S. 18th St. (3)
1952. Jonas, Karl C., 2601 Parkway (30)
1963. Jones, Robert E., 111 N. 49th (39)
1963. Joseph, Rosaline R., 3401 N. Broad St. (40)
1961. Joyner, Claude R., Jr., 3400 Spruce St. (4)
1957. Kacher, Leon, 2037 Pine St. (3)
1957. Kane, Sydney H., 3458 Cottman Ave. (49)
1948. Kaplan, Louis, 2040 Pine St. (3)
1964. Kaplan, S. Richard, 419 S. 19th St. (19146)
1938. Kasper, Kelvin A., 135 S. 18th St. (3)
1958. Kasser, Max D., 37 S. 20th St. (3)
1945. Katz, G. Henry, 111 N. 49th St. (39)
1958. Katz, Jacob, 136 S. 16th St. (2)
1941. Kauffman, M. Luther, Medical Arts Bldg., Jenkintown, Pa.
1947. Kay, Calvin Frederick, Univ. of Pa. Hospital (4).
1954. Kaye, Robert, Children's Hospital, 1740 Bainbridge St. (46)
1947. Keefer, George Pfahler, 136 S. 16th St. (2)
1963. Keeley, Francis X., Professional Bldg., 1533 Haddon Ave., Camden, N. J.
1949. Keiserman, Joseph, 5460 Baltimore Ave. (43)
1959. Keitel, Hans G., 1025 Walnut St. (7)
1932. Kelly, Herbert T., 1830 Delancey Place (19103)
1961. Kelly, William E., 111 N. 49th St. (39)
1941. Kennedy, Patrick J., 32 Hampden Rd., Upper Darby, Pa.
1948. Kern, Franklin Moore, 903 Nicholson Rd., Wynnewood, Pa.
1921. Kern, Richard A., Temple University Hospital, 3401 N. Broad St. (40)
1935. Keyes, Baldwin L., 2031 Locust St. (3)
1960. Kimmich, John M., Campbell Company, Camden, N. J.
1936. King, Orville C., 330 S. 9th St. (7)
1952. Kirshner, Jacob J., 1930 Chestnut St. (3)
1960. Kitchell, J. Roderick, Abington Hospital Medical Office Bldg., 1245 Highland Ave., Abington, Pa. (19001)
1920. Klein, Thomas, 250 S. 18th St. (3)
1952. Kleinbart, Morris, 1922 Pine St. (3)
1954. Kligman, Albert M., 36th & Spruce Sts. (4)
1934. Kline, Oram R., 514 Cooper St., Camden, N. J.
1959. Kline, Oram R., Jr., 406 Cooper St., Camden 2, N. J.
1948. Klingensmith, Paul O., Med. Science Bldg., Lankenau Hosp. (19151)
1958. Klingensmith, Walter C., 3600 Spruce St. (4)
1956. Klinghoffer, June F., Woman's Medical College (29)
1932. Klopp, John W., Gwynedd Valley, Pa.
1960. Knopf, Carl L., 5312 Spruce St. (39)
1960. Knorr, John K., 3rd., Lankenau Medical Bldg. (19151)
1959. Knowles, Harry J., 255 S. 17th St. (3)
1945. Kobler, H. B., 658 N. 63rd St. (19151)
1959. Koiwai, Eichi Karl, 235 N. 15th St. (2).
1963. Kolbe, Henry W., Philadelphia General Hospital (19104)
1957. Koltes, John A., Jefferson Hospital, 14th Annex, 10th & Sansom Sts. (7)

1936. Konzelmann, Frank Williamson, Shore Memorial Hosp., Somer's Point. N. J.
1949. Koop, C. Everett, 1740 Bainbridge St. (46)
1964. Koppel, Max M., 4068 Roosevelt Blvd. (19124)
1952. Kornblueh, Igho H., Welsh Rd., & Verree Rd. (15)
1958. Kovach, Coleman W., 2031 Locust St. (3)
1941. Krall, J. Thomas, 85 N. Lansdowne Ave., Lansdowne, Pa.
1948. Kramer, David W., 2007 Pine St. (3)
1954. Krasnoff, Sidney O., Tabor Medical Bldg., York & Tabor Roads (41)
1944. Krauss, Frederick Harold, 136 S. 16th St. (2)
1952. Kravitz, Charles H., 626 Ashbourne Rd., Elkins Park, Pa.
1964. Kremens, Victor, 60 E. Township Line Road, Elkins Park, Pa.
1949. Kressler, Robert J., 330 S. 9th St. (7)
1941. Krewson, William E., 3rd, 1930 Chestnut St. (3)
1914. Krumbhaar, Edward B., P. O. Box 4056 (18)
1947. Kuhlenbeck, Hartwig, Woman's Medical College, 3300 Henry Ave. (29)
1964. Kustrup, John F., 1418 S. Broad St., Trenton, N. J.
1947. La Boccetta, Alfred Charles, Philadelphia General Hospital, 34th St. & Curie Ave. (4)
1952. Lachman, John W., 3401 N. Broad St. (40)
1963. LaFia, David J., Methodist Hospital Medical Bldg. (19148)
1951. Lame, Edwin L., 51 N. 39th St. (4)
1950. Lamont, Austin, 3400 Spruce St. (4)
1946. Lampe, William T. 4207 Tyson Ave. (35)
1962. Landis, Harry P., Jr., 901 Columbia Ave., Palmyra, N. J.
1963. Lang, Leonard P., 1009 Park Place, Wilmington, Del.
1952. Lang, Warren R., 1012 Walnut St. (7)
1941. Langner, Paul H., Jr., 1208 Edmonds Ave., Drexel Hill, Pa.
1945. Lansbury, John, 3401 N. Broad St. (40)
1926. Laws, George M., 1907 Spruce St. (3)
1950. Learner, Norman, 3701 N. Broad St. (40)
1920. Leavitt, Frederic Headley, 1527 Pine St. (2)
1941. Leberman, Paul R., Hospital of the University of Pennsylvania (4)
1957. Lee, Charles Trumbull, Jr., 33 E. Chestnut Hill Ave. (18)
1952. Lehman, J. Stauffer, 230 N. Broad St. (2)
1961. Leibfried, Jane M., 5501 Green St. (44)
1951. Leivy, Frank E., 135 S. 19th St. (19103)
1944. Lell, William A., 333 S. 18th St. (3)
1935. Lemmon, William T., 133 S. 36th St. (4)
1963. Lenahan, Paul J., Walnut Park Plaza Hotel (39)
1955. Leopold, Robert L., 269 S. 19th St. (3)
1944. Lettiere, Anthony J., 425 E. State St., Trenton, N. J.
1933. Levering, J. Walter, The Benson, Apt. 709, Jenkintown, Pa.
1959. Levick, Leonard J., 1300 E. Cliveden St. (19)
1958. Levine, Samuel, 7100 N. 19th St. (26)
1964. Levit, Edithe J., 133 S. 36th St. (19104)
1964. Levit, Samuel M., 1910 Spruce St. (19103)
1958. LeWinn, Edward B., Wyncote, Pa.
1915. Lewis, Fielding O., Providence Road, Media, Pa.
1960. Lewis, George C., Jr., 230 N. Broad St. (2)
1964. Leymaster, Glen R., Woman's Medical College, 3300 Henry Ave. (19129)
1955. Lieberman, George E., 269 S. 19th St. (19103)
1956. Likoff, William, 249 N. Broad St. (2)
1962. Lilley, George W., 316 W. 9th St., Chester, Pa.
1940. Limberger, William A., 301 S. Church St., West Chester, Pa.

1958. Lin, David Y. P., 2222 S. Broad St. (45)
1938. Lindauer, M. August, 133 S. 36th St. (4)
1956. Lindquist, John N., 422 Sabine Ave., Wynnewood, Pa.
1927. Lindsey, Walter H., 102 Park Drive, Highland Park, Doylestown, Pa.
1936. Lintgen, Charles, 1930 Chestnut St. (3)
1958. Lipschutz, Arthur, 7974 Fayette St. (19)
1959. Lipshutz, Herbert, 807 Spruce St. (19107)
1953. Lipsius, Edward I., 319 S. 16th St. (3)
1959. Little, Ralph B., 111 N. 49th St. (39)
1944. Livezey, Mary M., 133 S. 36th St. (4)
1936. Llewellyn, Thomas H., 910 N. 63rd St. (19151)
1907. Lodholz, Edward, The Fairfax, 43rd & Locust Sts. (4)
1963. London, Russell I., 6800 Castor Ave. (49)
1951. Long, Joseph P., 1930 Chestnut St. (3)
1935. Long, William L., 2038 Locust St. (3)
1931. Longaker, Edwin P., 41 E. Montgomery Ave., Ardmore, Pa.
1951. Lorber, Stanley H., 3701 N. Broad St. (40)
1961. Lorry, Ralph W., 1247 E. Luzerne St. (24)
1960. Lovett, B. Frank, 300 Broadway, Camden, N. J.
1963. Lubowitz, Richard M., Benson East Apts., Jenkintown, Pa.
1936. Lucchesi, Pascal Francis, 601 E. Gorgas Lane (19)
1960. Lucine, Albert A., 345 S. 19th St. (3)
1932. Lukens, Francis D. W., Univ. of Pa. Hospital (4)
1939. Luongo, Romeo A., 2054 Locust St. (3)
1947. Lurie, Max B., Henry Phipps Institute, Univ. of Pa. (4)
1951. Luscombe, Herbert A., 136 S. 16th St. (2)
1952. Lutman, Frank C., 100 W. Coulter St. (44)
1919. Lynch, Frank B., Jr., 809 Cambridge Apts., School House Lane (44)
1950. Lynch, J. Edward, Suite 305, Wynnewood House, 300 E. Lancaster Ave., Wynnewood, Pa.
1953. Lyons, John W., 255 S. 17th St. (3)
1932. McCahey, James F., Rittenhouse-Claridge, 18th & Walnut Sts. (3)
1965. McCarty, Daniel J., Jr., 230 N. Broad St. (19102)
1958. McClenahan, John L., 39 E. Chestnut Hill Ave. (18)
1935. McClenahan, William U., 33 East Chestnut Hill Ave., Chestnut Hill (18)
1955. McClure, Carroll R., 17 S. Church St., W. Chester, Pa.
1957. McConnell, Edward L., Jr., 2342 S. Broad St. (45)
1934. McCouch, Grayson P., Univ. of Pa. School of Medicine (4)
1962. McCracken, Stewart, 3701 N. Broad St. (40)
1938. McCrea, Lowrain E., 1930 Chestnut St. (3)
1958. McCune, Wallace G., 5555 Wissahickon Ave. (44)
1942. McDonald, P. Robb, Lankenau Medical Bldg. (19151)
1953. McDonnell, William V., West Jersey Hospital, Camden 4, N. J.
1952. McElroy, Robert C., 133 S. 36th St. (4)
1950. McFadden, William M., 1187 E. Washington Lane (38)
1949. McGavic, John S., 601 Montgomery Ave., Bryn Mawr, Pa.
1945. McGee, Lemuel Clyde, Hercules Powder Company, Wilmington, Del.
1954. McGehee, Edward H., 33 E. Chestnut Hill Ave. (18)
1952. McGlade, Thomas H., 719 Cooper St., Camden, N. J.
1956. McGrath, Raymond J., 1720 Spruce St. (3)
1959. McKeown, John J., Jr., 1012 Walnut St. (7)
1933. McLaughlin, James S., 330 S. 9th St. (7)
1924. McMillan, Thomas M., 1901 Walnut St. (3)
1924. McPhedran, F. Maurice, Cope House, Awbury Arboretum (19138)

1955. McStravog, Lawrence J., 6910 Market St., Upper Darby, Pa.
1954. MacFadyen, Bruce V., 1819 Pennsylvania Blvd. (3)
1943. MacFarlan, Douglas, 101 Church Rd., Ardmore, Pa.
1932. Macfarlane, Catherine, 136 S. 16th St. (2)
1964. Macht, Elmer L., Jr., York & Keith Roads, Abington, Pa.
1949. MacNeal, Perry Scott, 330 S. 9th St. (7)
1951. Mac Neish, W. J., 136 S. 16th St. (2)
1955. Macy, Dorothy, Jr., 705 Beechwood Road, Media, Pa.
1957. Madow, Leo, 111 N. 49th St. (39)
1935. Maeder, LeRoy M. A., 1910 Rittenhouse Sq. (3)
1952. Mahoney, J. Francis, 250 S. 18th St. (3)
1959. Mandel, Martin M., Benson Manor, Township Line & Washington Lane, Jenkintown, Pa.
1954. Manges, Willis E., Methodist Hospital, Broad & Wolf Sts. (48)
1949. Manlove, Francis R., 500 Williamson Rd., Gladwynne, Pa.
1960. Manning, Valentine R., 3336 Aldine St. (36)
1956. Manstein, George, 1351 Tabor Rd. (41)
1961. Mapow, Abraham B., 535 Pine St. (6)
1953. Marbach, A. Herbert, 1307 Tabor Rd. (41)
1948. Marden, Philip Ayer, University Hospital, 36th & Spruce Sts. (4)
1958. Marino, Daniel J., 422 East 22nd St., Chester, Pa.
1950. Marshall, E. Wayne, Jr., 1520 Spruce St. (2)
1951. Martin, William L., Hahnemann Hospital (2)
1952. Martucci, Albert A., 5015 Akron St. (24)
1953. Marx, Halvey E., 76 Brennan Drive, Bryn Mawr, Pa.
1953. Massey, Franklin C., 122 Hillside Road, Deepdale, Strafford, Pa.
1939. May, Hans, 255 S. 17th St. (3)
1951. Mayock, Robert L., 3600 Spruce St. (4)
1958. Mays, Ralph Whiteman, 154 W. Tulpehocken St. (44)
1961. Mechanick, Philip, Ford Rd. & Monument Ave. (31)
1952. Mecray, Paul, Jr., 405 Loucroft Ave., Haddonfield, N. J.
1951. Medinger, Frederick G., 1941 Woodland Road, Abington, Pa.
1959. Medoff, Joseph, 5400 Wynnefield Ave. (31)
1941. Mendell, Theodore H., 2023 Spruce St. (3)
1951. Mendelssohn, Edwin, 1301 Tabor Rd. (41)
1943. Meranze, David R., 1031 Lakeside Ave. (26)
1954. Mertens-Roesler, Elizabeth, 2910 Woodpipe Lane (29)
1956. Merves, Louis, 1015 Chestnut St. (7)
1955. Mervine, Thomas B., 133 S. 36th St. (4)
1959. Metzger, Harry N., 1815 Pine St. (3)
1964. Meyer, Edward C., Fitzgerald-Mercy Hospital, Darby, Pa.
1955. Meyer, Eugene A., 1438 Mt. Ephraim Ave., Camden, N. J.
1937. Meyer, George Phillip, 108 4th Ave., Haddon Hts., N. J.
1964. Michaile, Kenneth I., 1930 Chestnut St. (19103)
1956. Miller, Bernard Joseph, 6013 Greene St. (44)
1935. Miller, Ford A., 4016 Chestnut St. (4)
1939. Miller, Malcolm W., Lankenau Medical Bldg. (19151)
1939. Miller, Merle M., 6013 Greene St. (44)
1921. Miller, T. Grier, 133 S. 36th St. (4)
1955. Miller, William H., Fitzgerald Mercy Hospital, Darby, Pa.
1965. Mills, Lewis C., Hahnemann Medical College & Hospital, 230 N. Broad St. (19102)
1952. Minehart, John R., 4821 Germantown Ave. (44)
1952. Mintz, S. S., 1930 Chestnut St. (3)
1963. Mishkin, Mark M., Univ. of Pa. Hospital (19104)

1937. Missett, Joseph Vincent, Jr., 2031 Locust St. (3)
1950. Mitchell, John McK., Bryn Mawr Hospital, Bryn Mawr, Pa.
1952. Mitchell, Robert McNair, 807 Spruce St. (7)
1959. Mitterling, Robert C., Chestnut St. & Glendale Rd., Upper Darby, Pa.
1936. Montgomery, Hugh, 119 Glenn Road, Ardmore, Pa.
1936. Montgomery, John B., 1930 Chestnut St. (3)
1932. Montgomery, Thaddeus L., 2031 Locust St. (3)
1935. Moore, John Royal, 3401 N. Broad St. (40)
1947. Moore, Matthew Thibaud, 1813 Delancey Pl. (3)
1958. Moore, Samuel R., Jr., 1600 Arch St. (1)
1958. Morani, Alma D., 3665 Midvale Ave. (29)
1936. Morgan, David R., 218 W. Mt. Carmel Ave., Glenside, Pa.
1944. Morris, Harold H., 429 Montgomery Ave., Haverford, Pa.
1945. Morris, I. Paul, 1939 Cheltenham Ave. (17)
1964. Most, William, 994 Haddon Ave., Collingswood 7, N. J.
1957. Moyer, David G., 701 W. Main St., Lansdale, Pa.
1959. Moyer, John H., 230 N. Broad St. (2)
1941. Mucklé, Craig Wright, 1806 Garrett Rd., Lansdowne, Pa.
1929. Mudd, Stuart, Department of Bacteriology, Univ. of Pa. School of Medicine (4)
1960. Mulberger, Robert D., 1930 Chestnut St. (3)
1934. Mullen, Edward A., 472 Roxborough Ave. (28)
1930. Murphy, Douglas P., 601 S. Bowman Ave., Merion Station, Pa.
1953. Murphy, Edward J., Bryn Mawr Medical Bldg., Bryn Mawr, Pa.
1958. Murphy, John J., 3600 Spruce St. (4)
1959. Murray, Edwin N., 130 N. Broadway, Camden, N. J.
1955. Murtagh, Frederick, Jr., 3401 N. Broad St. (40)
1951. Myers, David, 3701 N. Broad St. (40)
1955. Nachod, Grace R., 5501 Greene St. (44)
1945. Naide, Meyer, 2034 Spruce St. (3)
1951. Naidoff, David, 3500 Tudor St. (36)
1950. Nardone, Anthony A., 912 S. 49th St. (43)
1959. Neal, Hunter, S., 406 Lankenau Medical Bldg. (19151)
1958. Nealon, Thomas F., Jr., 1025 Walnut St. (7)
1948. Neese, Paul H., 17 Derwen Road, Cynwyd, Pa.
1963. Nelson, Arthur D., 3400 N. Broad St. (40)
1936. Nelson, Guy M., 255 S. 17th St. (3)
1943. Nelson, Waldo E., 615 Moreno Rd., Narberth, Pa.
1955. Nemir, Paul, Jr., 19th & Lombard Sts. (1946)
1935. Nicholson, Jesse Thompson, 1740 Bainbridge St. (46)
1960. Nicholson, John W., III, 115 Chestnut St., Moorestown, N. J.
1964. Noon, John R., Jr., Greene & Coulter Sts. (19144)
1947. Noone, Ernest L., 4501 Cedar Lane, Drexel Hill, Pa.
1954. Norris, Charles M., 3401 N. Broad St. (40)
1905. Norris, George W., 250 S. 18th St. (3)
1938. Norris, Robert F., 513 Wynnewood Ave., Wynnewood, Pa.
1963. Novack, Paul, 230 N. Broad St. (2)
1957. Oakey, Richard S., Jr., 309 Medical Bldg., Lankenau Hospital (51)
1963. O'Hara, A. Edward, Jefferson Medical College Hospital (19107)
1947. O'Keefe, John J., 255 South 17th St. (3)
1954. Olsen, Axel K., 230 N. Broad St. (2)
1949. O'Neill, James F., 1425 Woodland Rd., Rydal, Pa. (19046)
1954. O'Neill, Thomas, J. E., Centennial Bldg., Front St. & Lehigh Ave. (25)
1947. Ornsteen, A. M., 2007 Delancey Pl. (3)

1936. Orr, Theodore E., 918 Truepenny Rd., Media, Pa.
1955. Ottenberg, Donald J., Beury Bldg., 3701 N. Broad St. (40)
1913. Outerbridge, George W., 1927 Spruce St. (3)
1961. Owen, Barbara J., Bryn Mawr Hospital, Bryn Mawr, Pa.
1949. Padis, Nicholas, Lankenau Medical Bldg. (51)
1909. Parish, Benjamin Dores, Cresheim Arms Hotel, Allens Lane & Bryan St. (19)
1963. Parish, Benjamin D., Jr., 1201 Bethlehem Pike, Flourtown, Pa.
1945. Park, Felix Roman, 1980 Utica Sq., Tulsa, Okla.
1940. Parker, Alan P., Bryn Mawr Medical Bldg., Bryn Mawr, Pa.
1948. Parkhurst, Leonard Woods, 330 S. 9th St. (7)
1952. Paxson, Newlin F., 245 N. Broad St. (7)
1932. Payne, Franklin L., Univ. of Pa. Hospital (4)
1954. Pearce, Alexander E., 1420 Race St. (2)
1958. Pearce, Rowan C., Jr., 327 Cooper St., Camden, 2, N. J.
1943. Pearson, Gerald H. J., Presidential Apts.—Adams House (31)
1954. Pearson, Manuel M., 111 N. 49th St. (39)
1952. Peck, Roy I., 3400 Spruce St. (4)
1960. Peltz, William L., 111 N. 49th St. (39)
1930. Pendergrass, Eugene P., Univ. of Pa. Hospital (4)
1953. Penneys, Raymond, University of Pennsylvania Hospital (4)
1942. Perkins, William Harvey, The Lenox, 13th & Spruce Sts. (7)
1946. Perloff, William Harry, Albert Einstein Medical Center (41)
1964. Perrin, George M., First Floor Mills Bldg., Philadelphia General Hospital, 34th & Curie Ave. (19104)
1940. Pessel, Johannes F., 224 West State St., Trenton, N. J.
1952. Peters, Michael, Fairhill Rd., Hatfield, Pa.
1961. Peterson, Lysle H., Bockus Research Institute, 19th & Lombard Sts. (19146)
1940. Pettit, Horace, Times Medical Bldg., Ardmore, Pa.
1949. Pettit, Mary DeWitt, 3343 W. Penn St. (29)
1915. Pfeiffer, Damon B., Meadowbrook, Pa.
1946. Pfeiffer, Mildred C. J., 358 Valley Rd., Merion, Pa.
1935. Phillips, Arthur W., 3904 Walnut St. (4)
1961. Phillips, William A., Eastern Pennsylvania Psychiatric Institute (29)
1911. Piersol, George Morris, 308 Kent Rd., Wynnewood, Pa.
1948. Pierson, Daniel B., Jr., 740 Beacon Lane, Merion, Pa.
1964. Pierucci, Louis, Jr., 1025 Walnut St. (19107)
1961. Pike, Anne H., 5603 Greene St. (44)
1957. Pilling, George Platt, IV, 2600 N. Lawrence St. (33)
1933. Pillsbury, Donald M., Univ. of Pa. Hospital (4)
1957. Platt, Ruth M., 441 Lyceum Ave. (28)
1951. Poinsard, Paul J., 2031 Locust St. (3)
1937. Polk, David Stewart, Rosemont, Pa.
1956. Pontarelli, Domenic J., 1037 Great Springs Rd., Rosemont, Pa.
1953. Porreca, George A., 1912 Spruce St. (3)
1932. Porter, Roland De Lance, Abington Medical Bldg., Abington, Pa.
1951. Post, Joseph W., 1930 Chestnut St. (3)
1951. Pote, Harry H., 103 E. Ridley Ave., Ridley Park, Pa.
1958. Potter, H. Phelps, Jr., Woman's Medical College (29)
1951. Pressman, Robert S., 170 W. Olney Ave. (20)
1965. Price, Joseph J., 36 Copley Road, Upper Darby, Pa.
1947. Prickett, John A., Warrington, Bucks County, Pa.
1954. Prince, Leon N., 2025 Spruce St. (3)
1931. Pryor, Charles Allen, 255 S. 17th St. (3)

1952. Pugh, James E., 614 Church Lane, Yeadon, Pa.
1947. Putney, Floyd Johnson, 1712 Locust St. (3)
1943. Radbill, Samuel X, 7043 Elmwood Ave. (42)
1953. Radbill, Sidney G., 37 S. 20th St. (3)
1953. Raffensperger, Edward C., 260 St. James Place (6)
1945. Rakoff, Abraham Edward, 269 S. 19th St. (3)
1953. Ralston, Edgar L., 3400 Spruce St. (4)
1931. Ramsey, Frank M., 620 E. Willow Grove Ave. (18)
1953. Ranieri, Tito A., 2320 S. Broad St. (45)
1941. Rankin, Charles A., Ludlow & Heather Rd., Upper Darby, Pa.
1951. Rathmell, Thomas K., 446 Bellevue Ave., Trenton, N. J.
1926. Ravdin, I. S., Univ. of Pa. Hospital (4)
1956. Ravdin, Robert Glenn, 3400 Spruce St. (4)
1959. Raventos, Antolin, 3400 Spruce St. (4)
1962. Raymond, F. Douglas, Jr., Bryn Mawr Medical Bldg., Bryn Mawr, Pa.
1964. Raymond, Samuel, 711 Maloney Bldg., University Hospital, 36th & Spruce Sts. (19104)
1961. Read, William T., Jr., Cooper Hospital, Camden, N. J.
1954. Reagan, Lindley B., 175 Madison Ave., Mt. Holly, N. J.
1960. Reed, Theodore P., Lankenau Medical Bldg. (19151)
1928. Reese, Warren S., 2118 Locust St. (3)
1919. Reimann, Stanley P., 703 W. Phil-Ellena St. (19)
1964. Reinhard, John J., Jr., 335 Woodstown Road, Salem, N. J.
1956. Reishtein, William A., 255 S. 17th St. (3)
1963. Reisinger, Paul B., 855 Berkeley Ave., Trenton, N. J.
1951. Rentschler, Laurence B., 5800 Ridge Ave. (28)
1945. Rhoads, Jonathan E., Univ. of Pa. Hospital (4)
1964. Rhoads, Rebecca M. P., 104 Station Ave., Westville, N. J.
1964. Rhoads, S. Creadick, 104 Station Ave., Westville, N. J.
1963. Rial, William Y., 111 Dartmouth Ave., Swarthmore, Pa.
1951. Richardson, Fred Mac D., 160 Carpenter Lane (19)
1919. Richardson, Russell, Shamona Mill, Downingtown, Pa.
1942. Riggs, Helena E., 150 Hewitt Rd., Wyncote, Pa.
1936. Ritter, Joseph A., 1034 Bryn Mawr Ave., Narberth, Pa.
1932. Robbins, Frederick R., 317 Milbank Rd., Bryn Mawr, Pa.
1952. Robbins, Robert, 3401 N. Broad St. (40)
1960. Robbins, William S., The Iroquois, Suite 1303, City Line & 47th St. (19131)
1954. Roberts, Brooke, 3400 Spruce St. (4)
1957. Roberts, Joan Mary, 4 W. Mt. Pleasant Ave. (19)
1932. Robertson, Harold F., 2118 Pine St. (3)
1964. Robinson, James H., 5900 Spruce St. (19139)
1938. Roche, Philip Q., Route 1, Conshohocken, Pa.
1961. Rodahl, Kaare, Lankenau Hospital Research (51)
1960. Roeders, Paul H., 330 S. 9th St. (7)
1955. Rogers, Fred B., 3401 N. Broad St. (40)
1951. Ronis, Bernard J., 2106 Spruce St. (3)
1948. Roscoe, Constantine R., 7226 Castor Ave. (24)
1928. Rose, Edward, 426 Owen Rd., Wynnewood, Pa.
1936. Rose, Elizabeth Kirk, 426 Owen Rd., Wynnewood, Pa.
1959. Rose, Isadore, 6000 W. Oxford St. (19151)
1952. Rose, S. Brandt, Chestnut Hill Hospital (18)
1946. Rosemond, George Parrott, 3401 N. Broad St. (40)
1960. Rosenow, Edward C., Jr., American College of Physicians, 4200 Pine St. (4)
1948. Rothman, Maurice M., 1727 Spruce St. (3)

1951. Rouse, George P., Jr., 250 South 18 St. (2)
1963. Rovit, Richard L., Jefferson Medical College (7)
1952. Roxby, Bruce S., 5501 Greene St. (44)
1955. Roxby, John B., Jr., 4821 Germantown Ave. (44)
1949. Royster, Henry P., 3400 Spruce St. (4)
1941. Royster, Hubert A., Jr., 888 Glenbrook Ave., Bryn Mawr, Pa.
1959. Rubin, Alan, 255 S. 17th St. (3)
1952. Rubin, I. Edward, 255 S. 17th St. (3)
1933. Rudolphy, Jay Besson, 230 S. 21st St. (3)
1946. Rupp, Charles, 133 S. 36th St. (4)
1947. Rush, Alexander, 330 S. 9th St. (7)
1960. Russell, George W., 430 Greenwood Ave., Wyncote, Pa.
1963. Rutter, William A., 425 Wister Rd., Wynnewood, Pa.
1945. Rynes, Samuel E., 334 S. 21st St. (3)
1963. Ryan, James J., 301 E. City Line, Bala-Cynwyd, Pa.
1965. Sachs, Marvin L., 133 S. 36th St. (19104)
1952. Sain, Fletcher D., Abington Medical Bldg., York & Keith Rds., Abington, Pa.
1958. Sall, Manuel, 255 S. 17th St. (3)
1952. Salner, Nathan P., 6812 Castor Ave. (24)
1952. Saltzman, Maurice, 2037 Spruce St. (3)
1944. Sampson, David Alan, 726 Braeburn Lane, Penn Valley, Narberth, Pa.
1964. Santangelo, Samuel C., 1941 Woodland Road, Abington, Pa.
1950. Sarner, Joseph B., 269 S. 19th St. (3)
1949. Saul, Leon J., Highland Ave., Media, Pa.
1908. Sautter, Albert C., 6733 Emlen St. (19)
1954. Savacool, J. Woodrow, 146 W. Tulpehocken St. (44)
1947. Saÿen, John J., 3600 Spruce St. (4)
1948. Scarano, Joseph Albert, 1432 S. Broad St. (46)
1917. Schaeffer, J. Parsons, 4634 Spruce St. (39)
1929. Scheffey, Lewis C., 601 Walnut Lane, Haverford, Pa.
1942. Scheie, Harold G., 3400 Spruce St. (4)
1929. Schenck, Harry P., 1235 Wyngate Rd., Wynnewood, Pa.
1945. Schlezinger, Nathan S., 255 S. 17th St. (3)
1961. Schlosser, Woodrow D., 3701 N. Broad St. (40)
1917. Schnabel, Truman G., 1704 Pine St. (3)
1958. Schnabel, Truman G., Jr., Phila. General Hospital (4)
1957. Schnall, Nathan, 2037 Pine St. (3)
1962. Schneider, Henry C., 4801 Penn St. (24)
1955. Schreader, Charles J., 318 W. Godfrey Ave. (20)
1958. Schreck, Kenneth M., Temple University School of Medicine (40)
1952. Schulz, Norbert J., 1901 Walnut St. (3)
1963. Schumacher, L. Richard, 60 E. Court St., Doylestown, Pa.
1950. Schumann, Francis, 8811 Germantown Ave. (18)
1948. Schwarz, Gabriel A., 133 S. 36th St. (4)
1962. Schwarz, Henry P., Philadelphia General Hospital (4)
1955. Schwegman, Cletus W., Hospital of the University of Penna. (4)
1930. Scott, John Porter, Children's Hospital, 1740 Bainbridge St. (46)
1950. Scott, Michael, 3401 N. Broad St. (40)
1940. Scott, T. F. McNair, Children's Hospital, 1740 Bainbridge St. (46)
1952. Seifer, Arthur F., 710 South Main St., Phoenixville, Pa.
1958. Sellers, Alfred M., Hosp. of the Univ. of Pa. (4)
1952. Semisch, Charles W., III, 1344 Gilbert Rd., Meadowbrook, Pa.
1961. Sencindiver, Paige V., 2301 South Broad St., Suite 101 (19148)

1958. Shafer, Albert H., 1004 E. Cherry Hill Apts., Cherry Hill, N. J.
1960. Shannon, Gerard M., 8118 Bustleton Ave. (15)
1950. Sharp, Reuben L., 719 Cooper St., Camden, N. J.
1964. Sharpe, A. Maxwell, 708 Sproul St., Chester, Pa.
1963. Sharples, Wynne, 928 Fidelity-Phila. Trust Bldg. (9)
1928. Sharpless, Frederick C., 621 Railroad Ave., Haverford, Pa.
1956. Shaw, Daniel L., Jr., 702 Knox Rd., Villanova, Pa.
1963. Shearburn, Edwin W., 306 Lankenau Medical Bldg., (19151)
1955. Shechter, Fred R., 2461 No. 54th St. (31)
1954. Shelley, Walter B., 36th & Spruce Sts. (4)
1955. Shenkin, Henry A., Episcopal Hospital (25)
1946. Shepherd, Samuel Garfield, 2039 Pine St. (3)
1932. Sheridan, Joyce T., 412 W. Durham St. (19)
1956. Sherson, Jacob S., 131 Channing Ave., Malvern, Pa.
1964. Shimkin, Michael B., Temple University School of Medicine (19140)
1936. Shipman, James Shelby, 514 Cooper St., Camden, N. J.
1958. Shipps, Hammell P., 719 Cooper St., Camden 2, N. J.
1957. Shope, Edward Pierce Lentz, 807 Wilson Bldg., Camden, N. J.
1946. Shoup, George Daniel, 121 W. Walnut Lane (44)
1955. Shubin, Harry, 6601 N. 21st St. (38)
1952. Shuman, Charles R., 3401 N. Broad St. (40)
1949. Sidlick, David M., 255 S. 17th St. (3)
1941. Silcox, Louis E., Lankenau Medical Bldg. (19151)
1956. Sillars, Charles H., Abington Memorial Hospital, Abington, Pa.
1963. Silverman, Daniel, 269 South 19th St. (19103)
1955. Silverstein, Alexander, 2114 Pine St. (3)
1961. Simmons, Vaughan P., The Fidelity Mutual Life Insurance Co. (1)
1954. Singmaster, Lawrence, 272 Cheswold Lane, Haverford, Pa.
1952. Skromak, Stanley J., 5108 Torresdale Ave. (24)
1929. Smith, Austin T., 330 S. 9th St. (7)
1964. Smith, Edgar C., 7100 Marshall Road, Upper Darby, Pa.
1965. Smith, Eleanor M., 3300 Henry Ave. (19129)
1955. Smith, J. Winslow, 3034 Darby Rd., Ardmore, Pa.
1933. Smith, Lauren Howe, 111 N. 49th St. (39)
1952. Smith, Richard T., 330 S. 9th St. (7)
1964. Smyth, Murray G. Jr., Smith Kline Instrument Co., 1500 Spring Garden St. (19101)
1951. Snape, William J., 573 Stevens St., Camden, N. J.
1938. Snodgrass, L. E., Barclay Hotel, 18th & Rittenhouse Sq. (3)
1953. Snyder, G. Gordon, Bryn Mawr Medical Bldg., Bryn Mawr, Pa.
1958. Sodeman, William A., 1025 Walnut St. (7)
1961. Soffe, Alvin M., 1930 Chestnut St. (3)
1935. Sokoloff, Martin J., 255 S. 17th St. (3)
1951. Solis-Cohen, Leon, 1530 Locust St. (2)
1964. Soll, David B., 4831 Leiper St. (19124)
1940. Soloff, Louis A., 3401 N. Broad St. (40)
1950. Somerville, William J., 37 S. 20th St. (3)
1944. Sommer, George N. J., Jr., 120 W. State St., Trenton, N. J.
1952. Sones, Maurice, Mt. Airy Medical Bldg. (19)
1951. Sonneborn, Duane G., 1200 W. Erie Ave. (24)
1928. Spaeth, Edmund B., 1930 Chestnut St. (3)
1958. Spaeth, Philip G., 1930 Chestnut St. (3)
1937. Spangler, John Luther, Devon, Pa.
1957. Spelman, Joseph Worcester, Dept. of Public Health, 13th & Wood Sts. (7)

1935. Spiegel, Ernest A., 6807 Lawnton Ave. (26)
1961. Spiegelman, Jay, Benson East Apt., Jenkintown, Pa.
1955. Spitz, Eugene B., 40–50 W. Front St., Media, Pa.
1958. Splendido, Joseph A., 608 W. Clivedon (19)
1961. Stahlgren, LeRoy H., 419 South 19th St. (46)
1960. Stainback, William C., Bryn Mawr Medical Bldg., Bryn Mawr, Pa.
1957. Stanley, Robert C. G., 2315 Edgemont Rd., Chester, Pa.
1927. Starr, Isaac, 505 Cresheim Valley Rd. (18)
1952. Stauffer, Herbert M., 3401 N. Broad St. (40)
1952. Stayman, Joseph W., Jr., 8815 Germantown Ave. (18)
1945. Stecher, H. Armin, 1510 Darby Rd., Havertown, Pa.
1952. Steiger, William A., 3401 N. Broad St. (40)
1964. Stein, Donald B., Jr., Fitzgerald-Mercy Hospital, Darby, Pa.
1946. Stein, Irvin, 1936 Spruce St. (3)
1953. Stein, Raymond O., 269 S. 19th St. (3)
1963. Steinberg, Stanley B., 2461 N. 54th St. (19131)
1936. Steinfield, Edward, 2200 Benjamin Franklin Parkway (30)
1951. Sterling, Julian A., 1008 Sharpless Rd. (26)
1948. Stevens, Lloyd W., 133 S. 36th St. (4)
1928. Stokes, Joseph, Jr., Henry Phipps Institute, 4219 Chester Ave. (19104)
1943. Stokes, S. Emlen, 129 Chester Ave., Moorestown, N. J.
1954. Stone, Hrant H., E. Shawmont Ave. (28)
1961. Strang, John E., 330 S. 9th St. (7)
1953. Strawbridge, Rendall R., Lankenau Medical Bldg. (19151)
1937. Strumia, Max M., Penn Valley, Narberth, Pa.
1960. Strumia, Paul V., Bryn Mawr Hospital, Bryn Mawr, Pa.
1951. Sturgis, Katharine Boucot, Woman's Medical College, Henry Ave. & Abbottsford Road (19129)
1927. Sturgis, Samuel Booth, 349 Wistar Rd., Wynnewood, Pa.
1930. Sunderman, F. William, 1833 Delancey Place (3)
1954. Sussman, Marcel S., 101 S. 20th St. (3)
1963. Sutliff, Frederick P., 3701 N. Broad St. (19140)
1952. Sweeney, Francis X., Station A, Marlboro, N. J. (07746)
1952. Talbot, Timothy R., Jr., 204 Booth Lane, Haverford, Pa.
1943. Tassman, Isaac S., 626 Four Penn Center Plaza, 16th & J. F. Kennedy Blvd. (19102)
1963. Tassman, William S., 626 Four Penn Center Plaza, 16th & J. F. Kennedy Blvd. (19102)
1946. Tauber, Robert, 2019 Walnut St. (3)
1952. Taylor, Ann Gray, 6364 Germantown Ave. (44)
1960. Taylor, Daniel B., 2241 Federal St. (46)
1956. Templeton, John Y., III, 805 Spruce St. (19107)
1951. Theodos, Peter A., 1930 Chestnut St. (3)
1961. Therman, Per-Olof, 111 N. 49th St. (39)
1959. Thomas, Arthur H., 5240 Vine St. (39)
1946. Thomas, Carmen C., 1930 Chestnut St. (3)
1964. Thomas, John W., 5900 Spruce St. (19139)
1952. Thompson, Charles M., 255 S. 17th St. (3)
1927. Thorington, J. Monroe, Cambridge Apts., Wissahickon Ave. & School House Lane (44)
1936. Thudium, William J., 700 Merion Square Rd., Gladwyne, Pa.
1954. Tindall, Dorothy D., 1930 Rittenhouse Sq. (3)
1935. Toland, Owen J., 336 Aubrey Rd., Wynnewood, Pa.
1952. Tondreau, Roderick L., 523 Old Gulph Rd., Bryn Mawr, Pa.
1949. Tornay, Anthony S., 2038 Locust St. (3)
1936. Towson, Charles Emory, 224 W. Washington Lane (44)

1955. Trimpi, Howard D., 501 N. 17th St., Allentown, Pa.
1954. Trommer, Philip R., 258 S. 18th St. (3)
1956. Troncelliti, Mario V., Pennsylvania Hospital (7)
1953. Tropea, Frank, Jr., 500 Mulberry Lane, Haverford, Pa.
1947. Trueman, Robert H., 2101 Chestnut St. (3)
1954. Truitt, R. Marshall, Jr., 740 Westview St. (19)
1959. Tuddenham, William J., Pennsylvania Hospital (7)
1938. Tuft, Louis, 1530 Locust St. (2)
1964. Tulsky, Emanuel G., Graduate Hospital, 19th & Lombard Sts. (19146)
1933. Tumen, Henry J., 1830 Rittenhouse Square (3)
1938. Turman, Christopher M., 1531 Amity Rd., Rydal, Pa.
1923. Turner, Creighton, H., 1731 Pine St. (3)
1954. Turner, Linton W., 3401 N. Broad St. (40)
1959. Tyson, R. Robert, 3401 N. Broad St. (40)
1937. Uhle, Charles A. W., Lankenau Medical Bldg. (19151)
1953. Ulin, Alexander, W., 230 N. Broad St. (2)
1907. Ullom, Josephus T., Carpenter and Quincy Sts. (19)
1960. Uricchio, Joseph F., 245 N. Broad St. (7)
1950. Valdes-Dapena, Antonio, 214 Plush Mill Rd., Wallingford, Pa.
1958. Van den Noort, Gordon S., 888 Glenbrook Ave., Bryn Mawr, Pa.
1937. Vander Veer, Joseph B., 330 S. 9th St. (7)
1937. Van Loon, Emily Lois, 255 S. 17th St. (3)
1960. Van Meter, Ralph H., 244 W. Main St., Moorestown, N. J.
1933. Vastine, Jacob H., 2nd, 267 Kent Rd., Wynnewood, Pa.
1963. Vaughn, Arthur R., Jr., 512 W. Erie Ave. (19140)
1958. Velkoff, Cyril L., 2100 Walnut St. (3)
1965. Viggiano, Louis X., 301 Long Lane, Upper Darby, Pa.
1952. Vischer, Thomas J., 5903 Greene St. (44)
1940. Voegelin, Adrian W., Germantown Professional Bldg. (44)
1941. Vogel, Stoughton R., 151 W. Tulpehocken St. (44)
1960. Wagenheim, Harry H., 1822 Spruce St. (3)
1949. Wagner, Frederick B., Jr., 800 Chauncy Road, Narberth, Pa.
1949. Wagner, Joseph A., 201 Highland Ave., Bryn Mawr, Pa.
1954. Wainer, Amos S., 1621 Spruce St. (2)
1938. Waldman, Joseph, 404 Meadowbrook Lane (18)
1955. Waldron, Jerome M., 2300 Cheltenham Ave. (50)
1932. Walkling, Adolph A., 330 S. 9th St. (19107)
1955. Warner, Halsey F., 100 W. Coulter St. (44)
1956. Watkins, E. Lloyd, 8811 Germantown Ave. (18)
1954. Waugh, Elizabeth S., 348 Greene Lane (28)
1952. Weaver, Harry S., Jr., 37 S. 20th St. (3)
1955. Weaver, Robert L., 26 Henley Rd. (31)
1953. Weber, Lennard L., 255 S. 17th St. (19151)
1930. Weeder, S. Dana, The Stafford House, Chelten & Wissahickon Aves. (44)
1954. Weiner, Louis H., Carlene Apts., 2500 Belmont Ave. (31)
1952. Weinstein, George L., 255 S. 17th St. (3)
1950. Weiss, Sidney, 2037 Locust St. (3)
1965. Weiss, William, Philadelphia General Hospital, 34th & Curie Ave., (19104)
1959. Wellenbach, Burton L., 255 S. 17th St. (3)
1951. Welty, Jack W., Montgomery Ave. & Owen Rd., Wynnewood, Pa.
1955. Wendkos, Martin H., Green Hill in Lower Merion (19151)
1962. Wentz, Clarkson, 20 S. Valley Road, Paoli, Pa.
1961. Wermuth, William C., 111 N. 49th St. (39)

1959. West, Clifton F., Jr., 406 Lankenau Medical Bldg. (19151)
1921. Whitaker, William, 4645 Oakland St. (24)
1936. White, Ellen Pawling Corson-, Gladwyne, Pa.
1960. Whiteley, William H., 1015 Chestnut St. (7)
1925. Widmann, Bernard P., 250 S. 18th St. (3)
1954. Wieder, Henry S., Jr., 330 S. 9th St. (7)
1939. Willauer, George, 6129 Greene St. (44)
1937. Williams, John C., 6370 Germantown Ave. (44)
1920. Williams, Philip F., 256 Broughton Lane, Villanova, Pa.
1950. Williams, R. G., Univ. of Pa. School of Medicine (4)
1927. Williamson, Ernest G., 6353 Woodbine Ave. (19151)
1945. Wilson, John F., 2013 Delancey Pl. (3)
1949. Wilson, William W., 133 S. 36th St. (4)
1957. Winkelman, N. William, Jr., 4141 Apalogen Rd. (44)
1963. Winston, Joseph M., Jeanes Hospital (11)
1941. Wirts, C. Wilmer, 2017 Delancey St. (3)
1961. Wise, Robert I., 1025 Walnut St. (7)
1953. Wohl, George T., Philadelphia General Hospital (4)
1933. Wohl, Michael G., 1727 Pine St. (3)
1958. Woldow, Irving, Einstein Med. Center, York & Tabor Rds. (41)
1958. Wolf, John H., 124 W. Walnut Lane (44)
1944. Wolf, Lewis R., 3474 Frankford Ave. (34)
1918. Wolferth, Charles C., 133 S. 36th St. (4)
1962. Wolferth, Charles C., Jr., 230 N. Broad St. (2)
1964. Wolfson, Robert J., 3701 N. Broad St. (19140)
1964. Wolgin, William, 2104 Delancey Place (19103)
1957. Wolkowicz, Michael I., 2022 Spruce St. (3)
1942. Wolman, Irving J., 7607 Woodlawn Ave. (26)
1932. Wood, Francis C., 3400 Spruce St. (19104)
1944. Wood, H. Curtis, Jr., 7010 Lafayette Ave., Fort Washington, Pa.
1953. Woodruff, Marston T., 4940 Penn St. (24)
1928. Wright, Carroll S., 1402 Spruce St. (2)
1960. Wurzel, Harold A., 3400 Spruce St. (4)
1964. Young, Alma L., 3343 W. Penn St. (19129)
1941. Young, Barton R., Germantown Hospital (44)
1961. Zanni, Anthony L., 111 N. 49th St. (39)
1957. Zaslow, Jerry, 1351 Tabor Rd. (41)
1955. Zatuchni, Jacob, 3401 N. Broad St. (40)
1946. Zeigerman, Joseph H., 2105 Spruce St. (3)
1949. Zintl, William J., 69th & Market Sts., Upper Darby, Pa.
1956. Ziserman, Abraham J., 2046 Pine St. (3)
1962. Zubrow, Sidney N., 521 Pine St. (6)
1933. Zulick, J. Donald, Abington Memorial Hospital, Abington, Pa.

Non-Resident Fellows

ELECTED

1936. Alexander, Fay K., Lincolnville, Maine
1953. Allman, David B., 104 St. Charles Place, Atlantic City, N. J.
1941. *Aronson, Ronald S., 9401 Byeforde Road, Kensington, Md.

* Military Service.

1954. Austin, George M., University of Oregon Medical School, Portland, Oregon
1942. Bachman, Carl, Rutherford, Napa Co., Calif.
1958. Ballinger, Walter F., II, Johns Hopkins Hospital, 1900 E. Monument Ave., Baltimore, Md. (21205)
1931. Bates, William, Harrisburg Hospital, Harrisburg, Pa.
1955. Beckfield, William J., Luther Hospital, 310 Chestnut St., Eau Claire, Wisconsin
1932. Behney, Charles A., P. O. Box 4256, San Jose Branch, Bisbee, Arizona
1955. Blank, Harvey, Jackson Memorial Hospital, Miami 36, Fla.
1921. Borzell, Francis F., R. D. 2, Box 2051, Browns Mills, N. J.
1937. Braceland, Francis J., The Institute of Living, 200 Retreat Ave., Hartford, Conn.
1951. Brinton, S. Jervis, Box 3, Avalon, N. J.
1948. *Brown, Robert B., U. S. Naval Hospital, Bethesda, Md.
1959. Browneller, Ellsworth R., Geisinger Medical Center, Danville, Pa.
1953. Burbidge, J. Raymond, 163 Nassau St., Princeton, N. J.
1948. Chapman, John P., Calle Fray Junipero Serra 26, Palma de Mallorca, Balearic Islands, Spain
1950. Chapple, Charles, C., 2612 Naylor Rd., S.E., Washington 20020, D. C.
1941. Cheleden, John, 1012 Volusia Ave., Daytona Beach, Fla.
1930. Clarke, Francis Mann, 116 New St., New Brunswick, N. J.
1926. Clerf, Louis H., 5575-8th Ave., North St. Petersburg, Fla.
1964. Cohen, Sheldon G., 309 S. Franklin St., Wilkes-Barre, Pa.
1930. Cottrell, James E., 27 Shinnecock Trail, Medford Lakes, N. J.
1960. Cowley, Allen W., Sr., 1919 N. Front St., Harrisburg, Pa.
1947. Cutler, Norman L., 1300 Harrison St., Wilmington, Del.
1941. *Cuttle, Tracy D., Portsmouth Naval Shipyard, Portsmouth, N. H.
1959. Dannenberg, Arthur M., Jr., Johns Hopkins School of Hygiene, 615 N. Wolfe St., Baltimore, Md. (21205)
1955. Daugherty, J. Arthur, 1511 N. Front St., Harrisburg, Pa.
1937. Davis, Perk Lee, Turkey Hollow, R.D. 5, Waynesburg, Pa.
1954. Deitrick, John E., Cornell Univ. Medical College, 1300 York Ave., New York 21, N. Y.
1941. Dixon, Harold M., 4805 46th St., N.W., Washington 16, D. C.
1953. Dixon, James P., Antioch College, Yellow Springs, Ohio
1961. Duane, Thomas D., 35 E. Elizabeth Ave., Bethlehem, Pa.
1959. Durgin, Bernice Elise, 221 N. Allegheny St., Bellefont, Pa.
1947. Durkin, John K., V.A. Hospital, Coatesville, Pa. (19320)
1955. Edwards, Margaret Hay, 800 4th St., S.W., Washington 24, D. C.
1953. Eisenberg, Isadore J., 2806 Green St., Harrisburg, Pa.
1951. Ellis, Mackinnon, V.A. Hospital, Martinez, Calif.
1957. *Errion, Arthur Robbins, U. S. Naval Hospital, St. Albans, L. I., N. Y.
1951. Ervin, Carl E., 240 North Third Street, Harrisburg, Pa.
1944. Estes, W. L., Jr., 35 E. Elizabeth Ave., Bethlehem, Pa.
1954. Evans, Harry D., Jr., American Cyanamid Co., 1 Caspar St., Danbury, Conn.
1952. Faller, Constantine P., 127 State St., Harrisburg, Pa.
1952. Flinn, Lewis B., 1306 Broom St., Wilmington 6, Del.
1940. Forrester, James S., Harrisburg Polyclinic Hospital, Harrisburg, Pa.
1951. Friedland, Carl K., 271 W. Blackwell St., Dover, N. J.
1947. Gaskill, Herbert S., 9648 E. Powers Drive, Englewood, Colo.
1913. Gates, Nathaniel, 10 Peterboro Ave., Detroit, Mich.
1958. Geckeler, George D., Tranquility, S. Windham, Vt.
1957. Giering, John Fleming, 84 James St., Kingston, Pa.
1931. Gilman, Robert Louis, Cheyney, Pa.
1954. Godfrey, Ellwood W., Princeton Hospital, Princeton, N. J.
1928. Gordon, Burgess L., 1550 Lake Shore Dr., Chicago, Illinois
1952. Grieco, Reynold M., 2 W. 4th St., Williamsport, Pa.

* Military Service.

1934. Griffith, John Q., Jr., 6 North Fredericksburg Ave., Margate, N. J.
1952. Gross, Elmer R., Medical Arts Bldg., Wilmington, Del.
1933. Gruber, Charles M., 1313 College Ave., Redlands, Calif.
1935. Haines, Harlan F., 231 N. Pine St., Seaford, Del.
1939. Hamblock, Leonard C., Masonic Homes, Elizabethtown, Pa. (17022)
1955. Harris, John H., 1301-A N. Second St., Harrisburg, Pa.
1932. Harris, Stanley E., 229 Maple Ave., Delanco, N. J.
1936. Hatch, Lerleen Clement, 1642 Saddle Hill Drive, Logan, Utah
1947. Hawthorne, Herbert R., 1016 Yardley Rd., Morrisville, Pa.
1928. Hayman, Joseph M., Jr., Tufts University Medical School, Boston, Mass.
1946. Hendrickson, Frank O., Jupiter, Fla.
1944. Hershey, J. Ivan, VA Hospital, Shreveport, La.
1955. Hills, Arthur G., 1000 N. W. 17th St., Miami, Fla. (36)
1933. Hitzrot, Lewis H., 161 Patton Ave., Princeton, N. J. (08540)
1950. Horn, Robert C., Henry Ford Hospital, Detroit, Mich.
1953. Imber, Irving, 428 Walnut St., Reading, Pa.
1958. Impink, Robert R., 405 Oley St., Reading, Pa.
1935. Ingleby, Helen, The Church House, Heacham, King's Lynn, England
1921. Ivy, Robert H., 104 Dalton Rd., Paoli, Pa.
1960. Jenson, William K., 715 Sheridan Ave., Cody, Wyoming
1952. Jones, Ralph, Jr., 666 Elm St., Buffalo, N. Y.
1955. Jordan, Charlotte B., 175 E. Brown St., E. Stroudsburg, Pa.
1955. Jordan, Claus G., 175 E. Brown St., E. Stroudsburg, Pa.
1936. Kain, Thomas M., 30 Northeast 97th St., Miami, Fla.
1956. Keffer, William H., 413 Oley St., Reading, Pa.
1947. Kelchner, Clyde H., 1125 Turner St., Allentown, Pa.
1944. LaMotte, William O., Brook Hill Farms, Hockessin, Del.
1954. LaMotte, William O., Jr., Professional Bldg., Wilmington 3, Del.
1936. Leaman, William G., Jr., P. O. Box 463, Unionville, Pa. (19375)
1943. Leopold, Irving H., The Mount Sinai Hospital, 100th St. & 5th Ave., New York, N. Y. (10029)
1952. Levan, John B., 401 Oley St., Reading, Pa.
1960. Lewis, David H., Hogenskildsgatan 13, Göteborg Ö, Sweden
1949. Lhamon, William T., Baylor University College of Medicine, Houston, Texas
1954. Light, John J. B., 25 N. 9th St., Lebanon, Pa.
1954. Lindenmuth, Woodrow W., VA Hospital, West Haven, Conn.
1948. Livingood, Clarence S., Henry Ford Hospital, Detroit 2, Mich.
1933. Long, Esmond R., Conifer, Pedlar Mills, Va.
1962. McGregor, Robert A., The Professional Bldg., Augustine Cut-Off, Wilmington 3, Del.
1948. McLaughlin, John T., 655 N. Central Ave., Glendale, Calif.
1950. Mackmull, Gulden, 174 Nob Hill Lane, Ventura, California
1942. Manges, Lewis C., Jr., Read Memorial Hospital, Hancock, N. Y.
1959. Maniglia, Rosario, Holy Spirit Hospital, Camp Hill, Pa.
1953. Margolies, Michael, 567 E. Chestnut St., Coatesville, Pa.
1955. Margolies, M. Price, 379 E. Chestnut St., Coatesville, Pa.
1935. Mason, James B., 1730 S. Jackson St., Tacoma, Washington
1932. Meade, Richard H., Jr., 750 San Jose Dr., Grand Rapids, Mich.
1936. Middleton, William Shainline, 2114 Adams St., Madison, Wisc.
1946. Miller, Franklin R., Snyder-Jones Clinic, First Nat. Bk. Bldg., Winfield, Kansas
1949. Motley, Hurley L., 1212 Shatto S., Los Angeles, Calif.
1949. Mulholland, Stanford W., % Harwood Memorial Hospital, Christiansted, St. Croix, Virgin Islands
1937. Nicholson, Samuel T., 2d, 642 High St., Pottstown, Pa.
1960. Ojers, Gaylord W., 35 E. Elizabeth Ave., Bethlehem, Pa.

1956. Oppenheimer, Albert, 224 E. Main St., Moorestown, N. J.
1926. Paul, John Rodman, 333 Cedar St., New Haven, Conn.
1959. Pendergrass, Henry P., Massachusetts General Hospital, Boston, Mass.
1950. Pincus, Irwin J., 610 N. Roxbury Drive, Beverly Hills, Calif.
1958. Rachlin, Lillian, 370 Golden Oak Drive, Portola Valley, Calif. (94026)
1938. Read, Hilton S., 5407 Atlantic Ave., Atlantic City, N. J.
1964. Reed, Miriam, 253 Witherspoon St., Princeton, N. J.
1958. Reinhardt, David J., III, 1303 Delaware Ave., Wilmington, Del.
1936. Reisinger, John A., 1835 Eye St., N.W., Washington, D. C.
1955. Rettew, Philip L., 612 Museum Rd., Reading, Pa.
1961. Richardson, Herschel E., 205 Mayerline St., Houston, Texas
1947. Rogers, Arthur Merriam, 1351 Durwood Drive, Charlotte, N. C.
1956. Rubenstone, Albert I., Mount Sinai Hospital, California Ave. at 15th St., Chicago, Ill. (60608)
1954. Sampson, Martin C., Wallace Laboratories, Cranbury, N. J.
1936. Sands, Joseph Evans, 135 107th St., Stone Harbor, N. J.
1945. Schell, James F., 506 Sharpley Lane, Wilmington, Del.
1921. Schumann, Edward A., 4141 Jackson Drive, Lafayette Hill, Pa.
1951. Seitchik, Joseph, Sinai Hospital of Baltimore, Baltimore, Md.
1941. Shands, Alfred R., Jr., Alfred I. duPont Institute, P.O. Box 269, Wilmington, Del. (19899)
1908. Shannon, Charles E. G., 9 Park St., Waterville, Maine
1964. Sharpe, William D., New Jersey College of Medicine, Jersey City, 4, N. J.
1950. Shiffer, Paul H., Dreher Ave., R.D. #2, Stroudsburg, Pa.
1951. Shorey, Winston K., 7117 Shamrock Drive, Little Rock, Arkansas
1933. Smelzer, Donald C., 207 E. Orange St., Lancaster, Pa.
1954. Smith, Charles W., 128 State St., Harrisburg, Pa.
1927. Smyth, Calvin M., Lumberville, Bucks Co., Pa.
1929. Sponsler, Marshall B., 103 Lansdowne Road, DeWitt, N. Y.
1955. Steel, Howard H., 211 Sherman St., Coeur d'Alene, Idaho
1942. Stengel, Alfred, Jr., 75 Highland St., Holden, Mass.
1955. Stevenson, Theodore D., Presbyterian Board of Foreign Missions, 156 Fifth Ave., New York 10, N. Y.
1934. Stewart, Sloan G., 6200 Atlantic Ave., Ventnor, N. J.
1931. Stiles, Merritt H., E. 406 14th Ave., Spokane 3, Wash.
1953. Stroud, Morris W., 3rd, Harvard Rd., Cleveland, Ohio
1934. Summey, Thomas J., Morrowdale Farm, Rt. 2, Charlottesville, Va.
1961. Sunderman, F. William, Jr., University of Florida College of Medicine, Gainesville, Fla. (32603)
1931. Taylor, Norman H., Queen of the East, E. Broadway, Hamilton, Bermuda
1928. Thomas, J. Earl, Loma Linda University, Loma Linda, Calif.
1961. Thompson, James C., Harbor General Hospital, 1000 W. Carson St., Torrance, California
1942. Thompson, Wesley D., 247 E. 3rd St., Lewistown, Pa.
1941. Tompkins, Pendleton, 490 Post St., San Francisco, Calif.
1959. Toole, James F., Bowman Gray School of Medicine, Winston Salem, N. C.
1897. Veasey, Clarence A., 1118 W. 9th Ave., Spokane 9, Wash.
1941. Weaver, Ruth H., 108 Atlantic Ave., Atlantic City, N. J.
1957. Webster, Marie, 1623 Hyde St., San Francisco 9, California
1959. Whayne, Tom F., University of Kentucky Medical Center, Lexington, Ky.
1936. Wilder, Theodore S., Linden Lane, Sherborn, Mass.
1935. Willard, John H., Harlan Memorial Hospital, Harlan, Kentucky
1949. Willson, J. Robert, University of Michigan Medical Center, Ann Arbor, Michigan (48104)
1948. Winston, Julius, 1616 Pacific Ave., Atlantic City, N. J. (08400)
1963. Wood, Horatio C., IV, Cincinnati General Hospital, Cincinnati, Ohio
1953. Zarafonetis, Chris J. D., Simpson Memorial Institute, University of Michigan, Ann Arbor, Michigan

Honorary Fellows

Limited to Fifty, of Whom Twenty May be Foreigners.

American

ELECTED

1964. Corner, George Washington, A.B., M.D., SC.D.(HON.), LL.D.(HON.), 1810 Rittenhouse Square (3)
1959. Fay, Marion, B.A., M.A., PH.D., SC.D.(HON.), LL.D.(HON.), Woman's Medical College, Henry Ave. & Abbottsford Rd. (29)
1965. Gurin, Samuel, PH.D., University of Pennsylvania School of Medicine, 36th and Hamilton Walk, Phila. (19104)
1936. Richards, Alfred Newton, PH.D., SC.D.(HON.), M.D.(HON.), LL.D.(HON.), Emeritus Professor of Pharmacology, School of Medicine, and Associate Trustee, University of Pennsylvania. (4)
1958. Shryock, Richard H., PH.D., LL.D.(HON.), American Philosophical Society, Independence Square (6)
1947. Stone, Robert Spencer, M.D., University of California Medical School, San Francisco, Cal.

Foreign

1937. Dale, Sir Henry Hallet, C.B.E., F.R.S., M.A., M.D., F.R.C.P., 52 Queen Anne St., London, W. 1, England
1955. Mann, Ida, M.A., D.SC., M.B., B.S., L.R.C.P., D.O.M.S., F.R.C.S., Ophthalmic Consultant to the Government of W. Australia, 56 Hobbs St., Nedlands, Perth, W. Australia
1962. Schweitzer, Albert, PH.D., TH.D., M.D., D.D.(HON.), MUS.D.(HON.), LL.D.(HON.), O.M., Lambaréné Hospital, Lambaréné, Gabon Republic, W. Africa

Honorary Associate Fellows

1955. Clement, Martin W., 6. Penn Center Plaza (4)
1955. Diemand, John A., President, Insurance Company of North America, 1600 Arch St. (2)
1964. Pew, J. Howard, Grays Lane & Mill Creek Road, Ardmore, Pa.

Necrological List

Resident Fellows	*Date of Election*	*Date of Death*
1. Bernstein, Mitchell	January 6, 1941	March 24, 1964
2. Costello, Thomas J.	January 9, 1946	July 25, 1964
3. Cowan, Alfred	October 1, 1924	October 11, 1964
4. Dewees, A. Lovett	May 7, 1928	January 15, 1965
5. Fewell, Alexander G.	December 3, 1924	January 4, 1965
6. Mann, Bernard	May 11, 1936	August 3, 1964
7. Margolies, Alexander	January 11, 1937	September 25, 1964
8. Melnick, Theodore	January 5, 1955	January 5, 1965
9. Mohler, Roy W.	May 9, 1932	August 6, 1964
10. Noon, John R., Jr.	April 1, 1964	December 29, 1964
11. Rehfuss, Martin E.	June 2, 1920	July 29, 1964
12. Reiff, E. Paul	October 5, 1921	November 20, 1964
13. Sharpe, A. Maxwell	April 1, 1964	January 25, 1965
14. Viek, Peter	February 2, 1955	October 29, 1964
15. Whelan, George L.	January 7, 1935	March 5, 1964
16. Wilson, Ross B.	January 11, 1937	September 23, 1964

Non-Resident Fellows	*Date of Election*	*Date of Death*
1. Moon, Virgil H.	May 7, 1928	April 15, 1964
2. Royer, B. Franklin	April 3, 1907	February 16, 1961

(Suggested Form of Bequest)

I hereby give, devise, and bequeath to The College of Physicians of Philadelphia, a charitable and educational association organized under the laws of the Commonwealth of Pennsylvania and the executive offices whereof are located in the City of Philadelphia, the sum of.....

a. which sum shall be used for the general purposes of said association;

b. which sum shall be added to and become a part of the general endowment fund of said association;

c. which sum shall be used by said association preferably for the following purposes:

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